THE AUTOMOBILE

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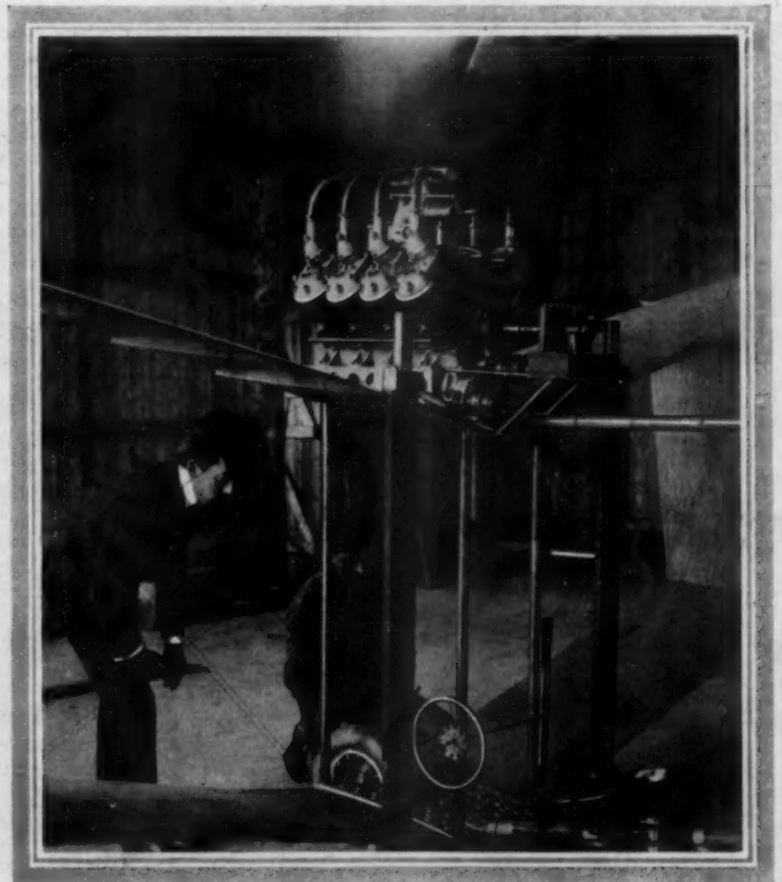
THE AUTOMOBILE

AEROPLANE WITH 100-H.P. EIGHT-CYLINDER MOTOR

PARIS, March 12.—In the quiet peacefulness of St. Cyr, near enough to the capital to obtain all necessary supplies, but far enough removed to be free from the visits of the idler about town, Alberto Santos-Dumont is working the Union ten hours a day on his new aeroplane. Yesterday was a holiday and a select reception day, the doors of the big wooden shed being thrown open and the new *Bird of Prey* brought out on the military cadets' drill ground in the presence of a number of officers from the engineer corps at Versailles and a small body of aeronauts. No attempt was made at flying, the machine, though apparently ready for a trip, needing the addition of a number of small but important parts and the engine requiring some attention.

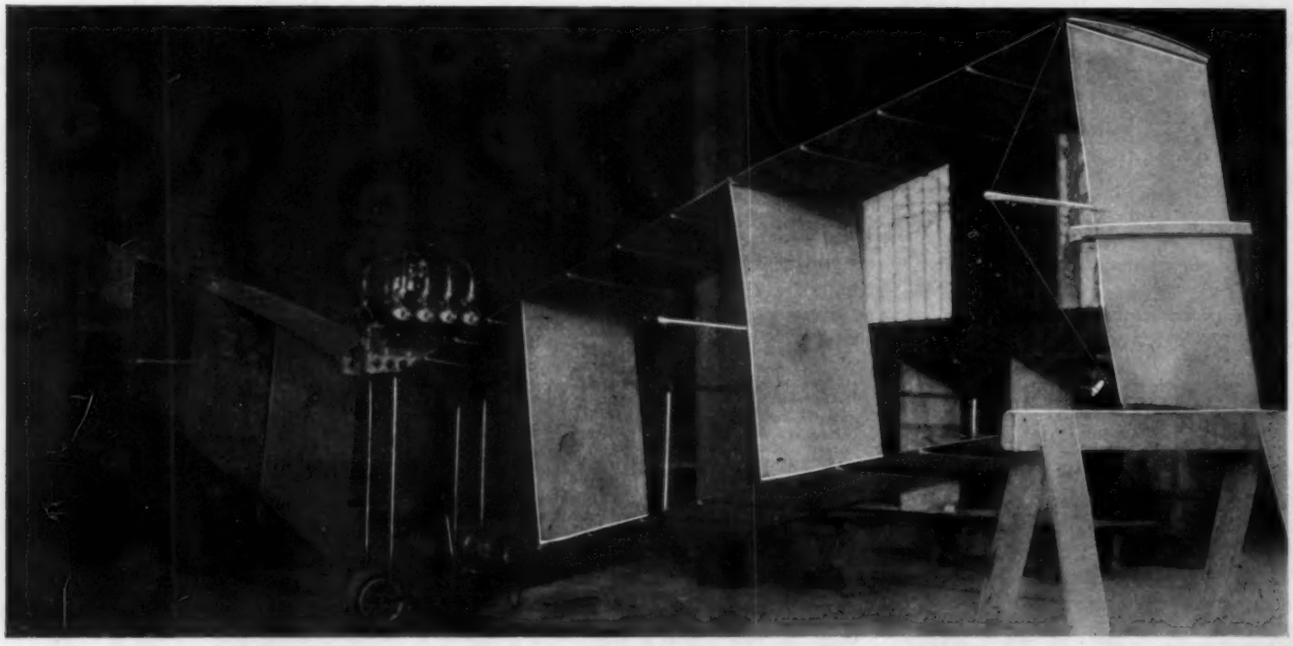
Santos-Dumont has profited by his past experience, the new flyer being a great improvement over the one with which he won the Archdeacon Cup for covering a distance of 220 meters in the air. It consists of two box-kite wings placed at an angle of eight degrees, having a spread from tip to tip of 42 feet. Their width is only 24 inches. All the canvas parts have been replaced by thin polished wood and the frame work is of light mahogany. The central frame is metal, the rear frame on which is mounted the rudder being of bamboo with metal stays. Total weight is 40 pounds less than that of the last flyer, *No. 14 bis*.

The most curious feature of the flying machine is that the motor, a 100-horse-power eight-cylinder Antoinette, is placed above and in the angle of the two wings. Metal stays, not shown on the engraving, will be carried up above the motor and will support the gasoline tank at the highest point. The two-bladed 78-inch aluminum propeller is placed in front of the apparatus. Santos-Dumont will be seated on a motorcycle saddle attached to the rear stay below and immediately behind the engine. He will sit in the attitude of a rower, with his legs stretched out on a small metal platform. Controlling levers will be immediately in front of the steersman. Instead of the pair of bicycle wheels, which always broke when the machine came down to ground, a single pneumatic wheel of small diameter but big bearing surface will be employed. Thus the machine will be very near the ground during its preliminary canter. To protect the pilot when running at high speed a celluloid wind shield will be fitted. It will only have a small area, as, owing to the position in which he is placed, the pilot will offer little resistance to the wind. The rudder of the new machine is placed in the rear. In addition there will be two small lateral rudders to give a better equilibrium and aid in turning. As a matter of prudence the aeroplane will be equipped with a speed indicator so that the action of the rudder causing the machine to rise in the air may not be given until a sufficient speed on the ground has been attained. Thirty-seven miles an hour is the speed necessary before flight will be attempted.



SANTOS-DUMONT INSPECTING GROUND WHEEL ON HIS NEW AEROPLANE.

Santos-Dumont declares that he has every confidence in the ability of the aeroplane to win the $10,000 prize of the Grand Prix de l'Aviation, the conditions of which are that a one-kilometer circuit shall be covered at a distance of not less than three feet from the ground. In about a week the machine will be completely terminated and as soon as the drill ground is sufficiently dry and weather conditions favorable flight will be attempted.



SANTOS-DUMONT'S FIFTEENTH FLYING MACHINE NEARING COMPLETION IN HIS WORKSHOP AT SAINT CYR.

M. Vuia, who commenced aeroplane experiments long before Santos-Dumont, has at last attained a certain amount of success. On the Bagatelle ground, in the Bois de Boulogne, several attempts were made this week. The first time the machine took a short jump only a few inches from the ground. On the second flight the machine rose four feet from the ground and traveled thirteen or fourteen feet. On a final attempt being made thirty or forty feet were covered at an increased height from the ground. M. Vuia is the second person in France to accomplish a successful flight on a heavier than air machine. Defects discovered in the aeroplane are its lack of equilibrium and a slight inefficiency in the 12-horsepower carbonic acid motor. On striking the ground one of the road wheels of the aeroplane was buckled up, thus preventing further trials for the present. It is interesting to note that the carbonic acid engine was designed by the late Leon Serpollet. In appearance the aeroplane resembles a bird with its wings extended. It is supported on a four-wheel frame, raising the wings about five feet from the ground.

Henri Kapferer has tested his new aeroplane built for him by Voisin Frères, and provided with a Buchet eight-cylinder engine. The trial took place on the Sartrouville plain, near Paris, but no attempt was made to rise from the ground.

De la Vaulx Finds Tobogganning Dangerous.

Comte Henry de la Vaulx, the well-known aeronaut, has been the victim of an unfortunate accident resulting in a broken leg, while tobogganning at Caux, Switzerland. He has been removed to the hospital of Saint-Jean-de-Dieu at Paris and is progressing as satisfactorily as can be expected. Owing to the complicated nature of the fracture, however, it is thought that it will be some time before the Count will again be able to take part in his favorite sport, and his chances of being able to participate in the Gordon Bennett balloon race at St. Louis are somewhat remote.

ITALY BARRED FROM BALLOON CUP RACE.

President Cortlandt F. Bishop, of the Aero Club of America, Monday received word that the International Aeronautic Federation had decided against the acceptance of the two Italian entries for the Gordon-Bennett Cup, same having been filed after the official closing of the entry list.

Lieut. Frank P. Lahm, last year's Cup winner, is to take charge of a government balloon station at Fort Leavenworth, Kansas, to be established there by the War Department.

MICHELIN TO OPEN AMERICAN FACTORY.

American tire manufacturers are to have a formidable competitor in the Michelin concern. M. Edouard Michelin, one of the heads of the great tire manufacturing company of Clermont-Ferrand, France, who has been in America for the last three weeks, announces that an American Michelin tire company has been incorporated with a capital of $2,000,000. The new company has purchased an important rubber plant to which large additions will be made at once. A staff of expert workmen will be brought over from the French factory and the methods employed at Clermont-Ferrand will be followed closely in the American works. It is expected that the first Michelin tires constructed in this country will be ready to put on the market next September. By constructing in this country Michelin will save the 35 per cent. for freight and duty and will be able to sell at the same price as the American makers. M. Edouard Michelin, who has made all the arrangements for the American factory, is technical director of the main factory at Clermont-Ferrand, employing 3,000 workpeople and making 1,000 tires a day. In addition, the company has a factory in England making 500 tires a day, and one in Italy. M. Michelin sailed for France yesterday.

UNITING THE HOUSES OF CHARRON-CLEMENT.

A cablegram from Paris announces the approaching marriage of Fernand Charron, the founder of the C. G. V. firm, with Mlle. Clément, daughter of the head of the great Bayard-Clément factory, and sister of Albert Clément, the well-known racing automobilist. Fernand Charron was three times the champion cyclist of France, won the first Gordon-Bennett race, founded the C. G. V. firm in 1901, and retained the position of general manager when the company was floated as a limited liability company last year under the title of Charron, Limited. Lately he has paid much attention to race horses, being successful as a gentleman rider in a large number of contests. Mlle. Clément is a well-known figure at all automobile races, for she makes a point of witnessing every race in which her brother is engaged. Her father, Gustave Clément, thirty years ago a bicycle maker employing one man and a boy, obliged to sell his first machine before he could start on the second, is now one of the richest men in France. In addition to his huge factories near Paris and at Mézières in the Ardennes, he has large interests in the Michelin tire factory and the Panhard concern, and is the financier of the lessees of the National Opera house at Paris.

FIRST BANQUET OF THE AERO CLUB OF AMERICA

THE first annual banquet of the Aero Club of America was held at the Hotel St. Regis, New York City, Thursday evening, March 14, 1907. The function called attention to the fact that there exists in this country a substantial organization of over a hundred members, the object of which is to advance the development of the science of aeronautics and kindred sciences, and to encourage and organize aerial navigation and excursions, conferences, expositions, congresses, and races. Orville and Wilbur Wright, the famous Ohio brothers, were expected guests of the occasion, but it was announced by President and Toastmaster Cortlandt F. Bishop that these two noted aeronauts were modest in such degree that it could not be conceived of in New York. Nevertheless, a letter was read from the Wrights wherein they reiterated and emphasized the claim that they have successfully solved aeroplane traveling.

President Bishop gave greeting to nearly 200 participants in the banquet, which had some excellent oratorical talent, even though in several instances brevity was to them an unknown quantity. The Gordon-Bennett trophy, which Lieut. Frank Lahm last year won for America, divided attention in the center of the speaker's table with the Aero Club Cup.

It so happened that the annual dinner of the Aero Club of France was held on the same night as that of the Aero Club of America, and cablegrams of best wishes were exchanged between the two organizations. The health of Lieut. Lahm was drunk standing during the playing of the National air. A message from the lieutenant was greeted with much applause, and, all in all, the occasion was one of intense enthusiasm and exceeding optimism regarding aerial flight. President Bishop announced October 19 as the date of the balloon race at St. Louis, and five countries will participate. Preparations for this great international event are progressing favorably.

President Bishop introduced James E. Smith, president of the Business Men's League of St. Louis, as the first speaker. Mr. Smith described the plans made for the big race, for which the city will furnish free gas, soldiers, and four extra prizes.

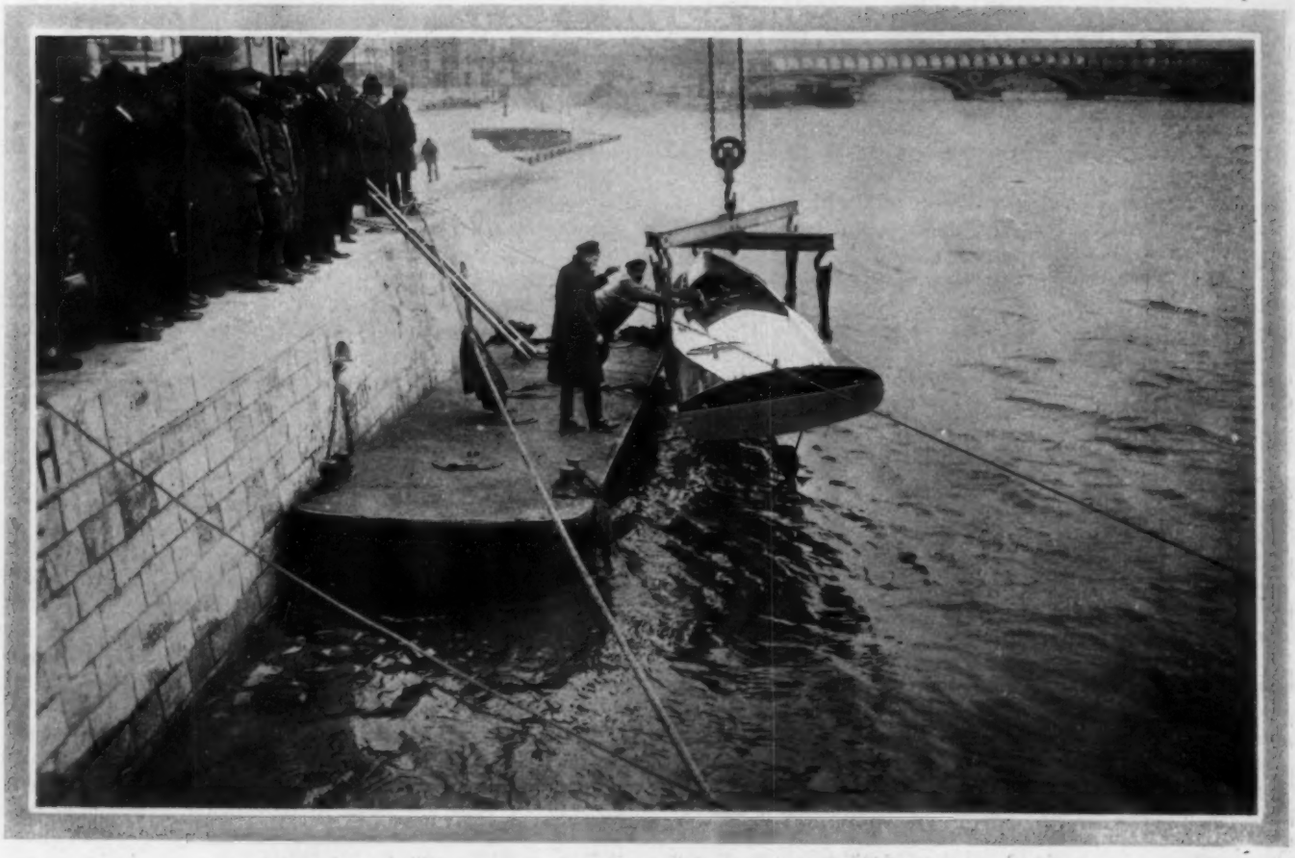
Colgate Hoyt, president of the Auto Club of America, followed. He pointed out a few of the advantages aeronauts had over autoists. The aeronaut had no tire troubles, and there were no spotters up in the air, where the coast was clear.

President Tucker of the Jamestown Exposition talked of the plans being made for aeronauts to visit Jamestown this summer, where there would be an aeronautical congress from April to November, with a recess to allow all hands to visit St. Louis. He declared that when they visited old Virginia they would not want to leave it.

McCready Sykes told many stories that put his audience in good humor, and E. B. Bronson described the first trip made in a dirigible balloon in this country, 'way back in 1863, when a machine built by Dr. Bartholomew Andrews sailed from Perth Amboy and made thirty miles in 14 1-2 minutes. Dr. Andrews experimented for years, and on June 21, 1849, had so far perfected his machine that he advertised in the New York *Sun* an exhibition to take place on July 4, and charged 50 cents admission for one man and two women. This ascension was not a success, because the steering apparatus did not work well.

The Hon. John S. Wise told of a famous ascension which he once made—in a dream—and descanted on the glories of Old Virginia. Burgess Johnson contributed some more humor, and then Anthony Fiala, the noted Arctic explorer, gave one of the most interesting talks of the evening, accompanying it with some excellent moving pictures. Mr. Fiala had some doubts as to the success of Mr. Wellman in utilizing the airship in reaching the North Pole.

PROMINENT AUTOMOBILISTS WILL BE NOTICED AMONG THOSE PRESENT AT THE HOTEL ST. REGIS, THURSDAY EVENING, MARCH 14, 1907.



LAUNCHING LA RAPIERE II. FROM THE TELLIER YARD BELOW AUTEUIL VIADUCT, PARIS.

LA RAPIERE II. A NOTABLE MONACO ENTRANT

PARIS, March 11.—There is tremendous activity among the numerous contestants in the Monaco motor boat meet to open on April 1. At every building yard of importance on the Seine in the neighborhood of Paris and in a few of the southern ports where motor boats have taken some hold work is being pushed forward as fast as possible to be ready for the opening of the meet. Although Paris is a considerable distance from the sea and on a river offering but meager facilities for fast motor boat work, it is in the neighborhood of the capital that the majority of the Monaco racers are being built. The grouping of the important French automobile factories around Paris is probably responsible for this.

At the Tellier Fils & Girard yard, just outside the city walls, *La Rapière II.* was launched this week and underwent trials on the straight stretch up to Billancourt. *La Rapière* is the worthy successor of the original *Rapière,* also built by Tellier Fils & Girard and engined by Panhard & Levassor, which carried all before her in the eight-meter class. Richard Brasier, with the famous but unfortunate *Trefle à Quatre,* was the first in France to produce a motor boat which attracted public attention for its remarkable speed. That was in 1904. The following year *La Rapière* was on everybody's lips, for she proved herself the fastest all-round boat produced up to that date. In her own class she was unbeaten and even in the open races against such monsters as the 300-horsepower *Dubonnet* and the *Panhard-Levassor* she was a most formidable rival. *La Rapière II.* is looked upon as quite as dangerous as her predecessors.

Other boats nearing completion at the Tellier yard are the *Mouvette* and the *Panhard-Tellier;* in addition the firm will be represented by Baron de Cater's *Seasick,* a craft which showed a remarkable rate of speed last year.

The Pitre yard at Maisons-Laffitte, on the Seine, is remarkably busy. Vincenso Florio's steel boat, *Mercedes-Florio,* is receiving very close attention and should be ready to take the water in about a week. *New Trefle II.,* to carry a Brasier motor, and an unnamed boat for Henry Fournier, equipped with an Itala motor, are on the stocks side by side with a small fleet of cruisers. Pitre has probably turned out more racing boats than any other firm in France.

Comte de Lambert's hydroplane, *Glisseur,* was added to the list of entries for Monaco at the last moment, thus providing a companion for the *Nautilus-Obus.*

TENNESSEE STATE HIGHWAY PROJECT.

MEMPHIS, TENN., March 18.—The inspiration of the east has reached the western section of Tennessee, giving its habitants also a hankering for good roads. The legislative council of the city of Memphis will be asked to co-operate with Nashville and other important cities in the State to establish a system of State highways. A bill contemplating the preliminary plans for such a system of roads has been prepared and will be introduced immediately after the recess. Despite the steady progress which has been made in the Central and Eastern States in favor of good roads, the South has up to the present remained indifferent. The bill which the city council will be asked to support only asks for a sufficient appropriation to cover the expenses of a preliminary tour. The idea is to connect Memphis with Knoxville by a State road.

OLYMPIA COMMERCIAL MOTOR SHOW

LONDON, March 9.—John Bull's ample chest swelled with national pride when the Lord Mayor of London came in all his official dignity to open the commercial vehicle exhibition in the banner bedecked Olympia Hall. His pride is not vain vanity, for the British motor constructor has indeed made enormous progress in the development of the automobile for commercial purposes. What pleases the Britisher most of all is that the Olympia show is British. The technical man knows that many of the engines are imported, that he has still to deal with Panhard & Levassor, De Dion-Bouton, Renard, Dietrich, Lacoste & Battemann, Darracq-Serpollet, and a host of others whose domicile is on the banks of the Seine; he knows that most of his big fleet of noisy, smoky omnibuses are made in Germany, and that France is not altogether foreign to their birth. But John Bull looks only at the labels which are All British. There is room for national pride, for the assembly of commercial vehicles is much more British than any other group of automobiles ever assembled in public exhibition in the metropolis. When Continental countries were profitably engaged in constructing high-grade pleasure cars and organizing impossible races the Anglo-Saxon was quietly occupying himself with the motor for business purposes. There were many disappointments and heavy losses between 1899 and 1901; from 1902 to 1904 there was steady improvement; at the end of 1904 the Heavy Motor Car Order gave an impetus to the industry by legalizing five-ton wagons and tractors and permitting the use of double-deck omnibuses. Within eighteen months London has added 230 steam wagons and tractors and 800 motor 'buses to its effective means of street transport.

It was owing to this extraordinary development that the management of the Olympia show decided to reserve last November's event entirely to pleasure automobiles and to hold a separate show in the same building for all classes of commercial automobiles, motor boats and accessories. The success of the show just opened proves the wisdom of the decision. There are eighty stands on which are shown light and heavy delivery vehicles, omnibuses, etc. The total number of exhibitors is 250. Grouped in the main hall are the various classes of commercial vehicles and machine tools. In the annex are the motor boats, and the galleries are reserved for tires and accessories. The decorative scheme is the same as was employed for the November Olympia show.

Gasoline motors are in a large majority for everything except the heaviest work. British firms are more numerous than the united foreign houses, though the latter still present a strong front, with such well-known names as De Dion-Bouton, Delahaye, Dietrich, Fiat, Gobron-Brillié, Isotta-Fraschini, Hotchkiss, Mercedes, Mors and Berliet.

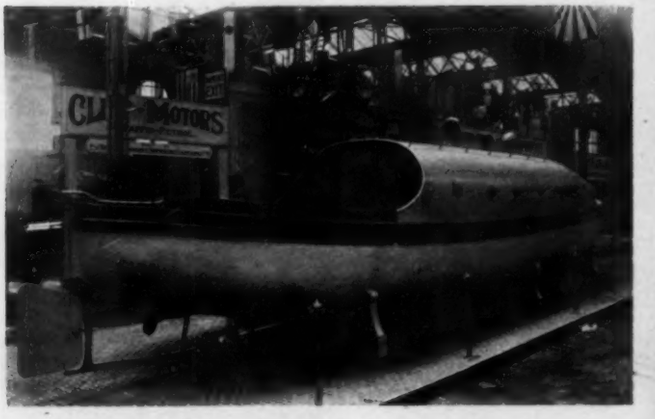
Steamers are a very good second. Excepting the Darracq-Serpollet combination, all the exhibitors in this class are of British origin. Steam has always been a favorite in this country, and although gasoline has secured first position for light and medium class work, it has been unable to oust its older rival or even successfully compete with it for powerful hauling. There is a certain amount of discussion among users of steam haulage on the relative value of steam wagons and tractors hauling a number of trucks. A tractor will cost about $2,250, while a steam wagon capable of doing the same amount of work would call for the investment of $3,500; but as the former must be completed by a number of trucks, there is but little difference in the total cost. Where regular five-ton loads can be furnished the steam wagon complete in itself seems to offer an advantage. The tractor is generally more profitable where varying loads have to be dealt with. Cost of maintenance, including driver, interest,

GENERAL VIEW OF THE OLYMPIA, LONDON, IN WHICH THE FIRST BRITISH COMMERCIAL VEHICLE SHOW IS BEING HELD.

FIAT FIVE-TON 40-HORSEPOWER TRUCK.

wages, stores, maintenance, depreciation and insurance, is generally the same in each case, $25 a week being an average sum for a five-ton wagon.

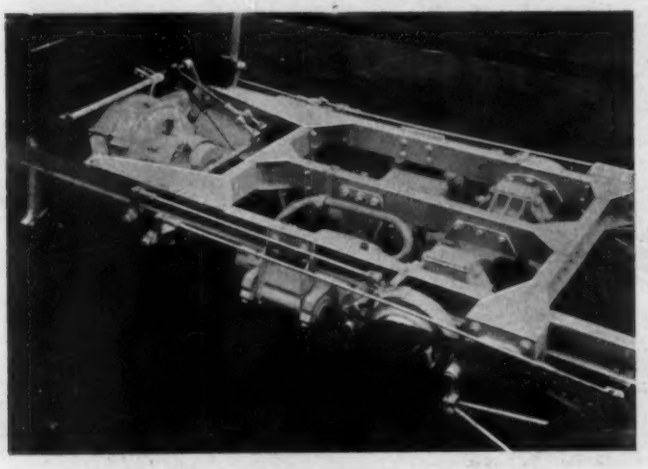
Electric vehicles are a very meagre class. The British business man has no faith whatever in electricity as a factor in commercial delivery work. Where slow speed and big hauling power are



BRITISH 40-FOOT SEAMLESS STEEL BOAT.

needed he employs steam, where he wants quick service he uses gasoline. Between the two there is no room for electricity. Of the four electric vehicle firms two show light vehicles, ambulances, etc., and two others, Greenwood & Batley and the British Thomson-Houston Company, have gasoline-electric vehicles.

Among the special features of the show are the number of omnibuses to be used by railroad companies for station work and



STRAKER-SQUIRE GASOLINE-ELECTRIC 'BUS.

as feeders in districts where the iron rail has not penetrated. Practically every important railroad company in England has adopted gasoline 'buses for use from their depots. Tramway companies, too, have taken up this class of vehicle as feeders and connecting links to their different termini. Rollers and lawn mowers are being given more attention than ever before. Whether used for road making, rolling or cutting grass, they are all operated by gasoline motors. The Renard train, the invention of the late Colonel Renard, attracts considerable attention. The train is not new, but it has only recently been introduced to England, and will shortly be constructed in the Daimler factory at Coventry.

In the marine section of the exhibition there are thirty-five firms, compared with twenty-nine at the show held fifteen months ago. Excepting Panhard-Levassor, Delahaye, and De Dion-Bouton, they are all British. The motor boat exhibit is far from being so comprehensive as the commercial vehicles, a number of important firms abstaining from exhibiting, owing to the diminished support given by the show committee.

EVIDENTLY CANADIAN TRADE IS COVETED IN ENGLAND.

THE TIRE PRODUCT OF TIRETOWN.

AKRON, O., March 18.—Approximately 62 1-2 per cent. of all of the tires on automobiles exhibited at shows in the large cities this winter was manufactured in Akron. This is the computation secured after an impartial investigation, and proves how important Akron is as the tire center of the country. The figures include the Boston show, held last week. By companies the tire count for all of the shows is as follows: Diamond, 591; Goodrich, 340; G & J, 117; International, 117; Morgan & Wright, 110; Michelin, 97; Continental, 90; Goodyear, 77; Firestone, 54; Ajax, 16; Fisk, 70. The remainder, 21, is scattered among other makes, the total being 1,700. In all 1,788 pleasure cars were shown at the exhibits.

The shows included in the statistics are: Madison Square Garden, New York; Grand Central Palace, New York; Chicago, Buffalo, Cleveland, Washington, Detroit, Philadelphia, San Francisco, Boston, and Minneapolis. The Akron companies in the above list of manufacturers are the Diamond, Goodrich, Goodyear, and Firestone. The last named, of course, manufactures many solid tires.

BOSTON BELIEVES IN MARCH DATES.

BOSTON, March 16.—The fifth annual show of the Boston Automobile Dealers' Association, the most successful exhibition of its kind ever held in New England, came to an end this evening. From whatever point of view it is considered, this show has been satisfactory. The exhibitors not only have sold many cars, almost every machine in the many spaces being marked with a "Sold" card, but they have got a very large number of prospective customers in line, and have enough follow-up business to keep them hustling until well into the spring.

Those Inter-City Winter Runs.

Besides the demonstrating, the outdoor side of the show attracted much attention on account of the runs from New York. Early in the week four cars were started from that city for Boston. They were an Aerocar, Dragon, Welch, and Wayne. The Dragon, Welch and Wayne were in a sort of competition for a trophy. The Aerocar came through safely, and also the Welch and the Dragon, and finally the Wayne, after much hard luck.

Friday a new record was established between New York and Boston by R. G. Kelsey, driving the Matheson with which the New York-Chicago run was made in January. Kelsey covered the distance from New York to this city in 14 hours 5 minutes elapsed time, his actual running time being 12 hours 45 minutes.

Boston Not Keen on Earlier Dates.

In consequence of the stories that have come from New York this week to the effect that both the A. L. A. M. and the A. C. A.-A. C. M. C. A. shows in that city would be held earlier than usual, there has naturally been some discussion of the question of holding the Boston show a month or more earlier. While some dealers think that a February show would have its advantages, the majority seem to feel that for the retail business March is the best time for the Boston show. If the New York shows are held in the fall it will help out the Boston show, in that when show-time comes the local dealers will be much better prepared than they are now to make deliveries. Very little agency business has been done here, as far as known not a single new agency being placed in this city during the show, so that all the business is between the dealers and people who are to own cars.

Providence Show This Week.

When the show closed to-night there was a grand hustle to get the cars, which are to be shown in Providence, out of the buildings. Many of the exhibition chassis and cars are to be sent to Rhode Island, while others will be kept in the local salesrooms for a few days or a week, in order to give show visitors a chance to see the machines at their leisure.

MARKET FOR AMERICAN AUTOS IN SPAIN.

Referring to the international automobile exposition to be held next May in Madrid, Consul-General B. H. Ridgely, of Barcelona, sends several prospectuses of the exposition wherein all the conditions are set forth. Copies of the same may be secured from the Bureau of Manufactures. Mr. Ridgely writes:

"This will be an excellent opportunity for American manufacturers to exhibit their products, but it must be repeated that it will not be worth while to show any one-cylinder machine here, as there is a pronounced prejudice against them, and virtually no sale for them. This same prejudice even applies to two-cylinder motors, and as a matter of fact there is little demand in Spain for other than those of four cylinders. Manufacturers who can offer a good, robust, cheap machine of this character, of from 16 to 20 horsepower, at prices ranging from $1,500 to $1,800, would probably find a prompt market.

"A good two-cylinder buckboard, provided the motor did not vibrate too strongly, however, would sell in Spain, if it could be offered at a reasonable price, and manufacturers having such machines to export would do well to exhibit them at the Madrid show.

"With the prospectuses referred to, there are various application books which intending exhibitors can fill up and forward to Monsieur le Directeur de l'Exposition de l'automobile, aux soins du Royal Automobile Club d'Espagne, Madrid, Spain. Automobiles intended solely for display at the exposition will be admitted into Spain free of customs duties."

FORMIDABLE PHALANX OF DEMONSTRATING CARS AT BOSTON'S AUTO SHOW, THAT WAS KEPT BUSY LAST WEEK.

A TRULY ARTISTIC BOSTON SHOW STAND, GRAY & DAVIS.

SOUTH AFRICA AS AN AUTOMOBILE MARKET.

Writing from Cape Town, South Africa, Special Consular Agent Raymond F. Crist throws considerable light on the status of South Africa as a market for the American automobile. "American makers have apparently entirely overlooked this fine market," he says, "for inquiry fails to reveal the presence of more than one American agent in all the British South African colonies, though it is an outlet to which the English and Continental makers have found it profitable to devote close attention. American makers appear to be quite content with an intermittent and spasmodic forwarding of beautifully gotten-up catalogues—an absolute waste of printed matter, postage and time. Automobiles in South Africa are not an article of luxury indulged in solely by those desiring pleasure and recreation—they are indispensable to the business success of every man who has relations with the mining industry, many of the most important mines being located fifty miles from Johannesburg, while the Witwatersand "Reef" extends for more than seventy miles, east and west.

The Johannesburg register shows 768 cars now in use, while 200 are reported to be in use in Cape Town. Prices range from $1,750, averaging about $2,000, and at a conservative estimate, there are said to be about $1,000,000 worth of automobiles in Johannesburg every day, while along the length of the "Reef" probably twice that value will be found. The average car is selected for its ability to withstand the hard knocks of the roughest kind of roads, climb steep grades and do the greatest mileage per gallon of gasoline. Although twelve to fifteen miles per gallon is now about the maximum average, upward of fifteen miles per gallon is demanded of new cars. Horsepowers range from 6 to 30, but speed is not desired, particularly owing to the nature of the roads. Steam cars are scarce on the Rand, owing to their greater fuel consumption. High clearance is imperative, and while both side-chain and shaft drives are popular, the latter is favored, owing to the great amount of sand, which shortens the life of the chains. Four speeds are required, as with three it has been found that even the lowest is too fast to plough through the long and heavy sandy stretches. Only water-cooled cars are used and they must be equipped with the heaviest tires.

American makers should avail themselves of this exceptionally rich field for the sale of automobiles by sending out salesmen to directly represent their machines. They must be prepared to meet active competitors now in the field from every auto-producing country and whose cars already have a reputation for meeting the difficulties of South African automobiling. A large field is also offered for motorcycles, most of those now seen being of British and German make, the latter predominating. They range in price from $200 to $250 and are very largely used. In Durban and Cape Town there are regular automobile and motorcycle clubs. For the year ending June 30, 1906, British South Africa imported $836,685 worth of motor vehicles.

THE WAYNE CAR IN WORCESTER EN ROUTE TO BOSTON.

ALBERT CHAMPION WITH IGNITION SURROUNDINGS.

SZISZ TO DRIVE AN AMERICAN'S RENAULT.

George C. Tyler, the well-known theatrical manager, who left last week for Europe, has just had built for him by Renault Frères, of Paris, the fastest touring car the firm has yet turned out. It is of the standard four-cylinder pattern, of 90 horsepower, and is guaranteed to do 118 miles per hour under the best conditions. Mr. Tyler will be met at Cherbourg by a party of friends, including Booth Tarkington and Harry L. Wilson, the latter the author of "The Spenders." Szisz, the Grand Prix winner, will be at the wheel of the new car. On his arrival in Paris, Mr. Tyler and his party will start East at once, and will go straight through to Constantinople. Some trouble is anticipated in getting the car over the Turkish border, and Mr. Tyler has armed himself with letters from Washington.

On Mr. Tyler's return he intends to visit Bucharest, Budapest, and the Austrian Tyrol; then go to Sicily; through Italy, Germany, and Denmark, and up to Norway, to which, by the way, he introduced the first automobile some few years ago. On his return he will travel through the south of France and will visit the poet and dramatist, Edmond Rostand, at his place at Cambo, at the foot of the Pyrenees. Mr. Tyler last year made 20,000 miles through Europe, and this summer expects to do more.

RUDIMENTS OF VALVE AND IGNITION TIMING

By CHARLES B. HAYWARD.

JUDGING from the frequency with which questions crop up on the subject of valve setting as well as inquiries regarding the reasons therefor, it is quite evident that the importance of the proper timing of the valves of a four-cycle motor is something that is not altogether clear to even that large class of autoists who are far beyond the stage of being merely good drivers. Every now and again there comes to light the old, old story of the man who took his motor apart and found he could not get it together again, but he is greatly in the minority when compared with the case of those who take the motor apart and put it together again—seemingly the same as before, but find that it either refuses to work altogether, or displays such strange symptoms of internal disorder that they are utterly at a loss as to the nature of its ailment. After trying every resource of the experienced driver with no result, the car is sent to a repairer, and there is more than one instance on record where the efforts of the latter have not been any more productive of betterment than those of the owner. To cite but a single instance, there may be mentioned the case of an autoist whose experience extended over several years, during which he had been the owner of no less than five cars, all of which he had taken care of personally, making all ordinary repairs and adjustments, and from all of which he had had good service, the car in question having done several thousand miles with but infrequent minor road troubles before the occasion in question arose. Owing to the peculiar design of the car, it was impossible to dismount the transmission without dismantling the motor—a fact that sheds considerable light on the accessibility of cars of not such extremely ancient vintage, as the origin of the one in question dated back but a few years.

An Instance in Point.

After relating the events that led up to the dismantling of the motor and the fact that continuous trouble followed in the wake of its reassembling, the writer goes on to state that a local repairman and machinist devoted several days' time to it with no result whatever. The case was not an extreme one, as the engine would run in a fairly satisfactory manner when not under load—something that tended to make the trouble appear more puzzling. To sum up the ailment briefly, there was such a considerable loss of power that the car could hardly be run on the high-gear at all, being incapable of doing ten miles an hour on the level, the most noticeable symptom being an escape through both the inlet and exhaust valves that sounded somewhat like backfiring. No amount of investigation of the carbureter or ignition system sufficed to reveal anything amiss, so that an appeal was made to a higher authority for advice in the matter, coupled with the significant statement that no more tinker work was wanted, as it had proved both expensive and unsatisfactory.

The case was not a difficult one to diagnose; everything pointed to improper timing, particularly what was referred to as a sort of backfiring which showed that neither the inlet nor the exhaust was being closed at the proper time, from which it is also quite evident that they were not being opened at the correct moment either, so that the motor was, in fact, running on but a fraction of the charge it was designed to get, and in consequence, but a fraction of the compression required for it to produce its rated output. Under such conditions, it is more of a wonder that it was possible to carry any load at all than that there was so much wrong, as with the modern high-speed motor of the automobile type, such a derangement is usually more than sufficient to prevent the motor from developing any power at all where it does not prevent its running.

Before taking up the subject of valve timing, it may be well to recall the functions of the four-part cycle, particularly as the present is not intended as a technical exposition of the subject, but rather one for the enlightenment of the novice. Starting with the engine dead, these are suction, compression, combustion and exhaust, following each other in the order named.

Elementary Requirements of Timing.

These four parts of the cycle must take place for every power stroke delivered by the engine, and each one must be complete in itself in order that the motor may deliver its maximum rated power. In other words, each one of these functions constitutes a complete operation in itself, and in consequence, any attempt to make them overlap one another unduly is bound to result in a loss of efficiency. When carried to an extreme, as in the case when the camshaft is improperly placed, it is easy to realize that this sequence may be lost entirely and the motor accordingly refuse to work. For instance, suction cannot take place unless there is a partial vacuum created in the cylinder by the down stroke of the piston; that is, the pressure in the cylinder must be reduced below that of the atmosphere in order for the charge to enter. If the exhaust valve remains open after the opening of the inlet valve, it is evident that these conditions will not be fulfilled. Taking the next operation, that of compression, it is at once apparent that unless the inlet valve be closed very shortly after the completion of the suction stroke, that more or less of the charge will be forced out through it, which will likewise be the case should the exhaust valve be improperly held open at this time. Then again, should the latter begin to open prematurely, or at point very early in the travel of the piston on its power stroke, that much of the useful expansion of the charge will be wasted through the exhaust, as was the case on some of the early motors, which made it next to impossible to muffle them efficiently. Should the inlet valve open too long before the completion of the exhaust stroke, some of the burnt gases are apt to be driven out through the intake pipe, temporarily putting the carbureter out of action and greatly reducing the amount of charge that the cylinder can draw in. Should either of the valves happen to be open at all when ignition occurs, or at any point during the greater part of the power stroke, the pressure will blow some of the burnt gases out through it, as seems to have been the case in the instance referred to where it is stated that something similar to backfiring occurred at both valves all the time.

Factors to be Considered.

Theoretically, then, it is plain that the inlet valve should open at the upper dead center, or beginning of the suction stroke, and close exactly at the other end of the stroke. In the case of the exhaust valve this should be reversed, opening exactly at the lower dead center and closing at the upper, at the same time as the inlet valve opens. But there are factors to be considered in the accomplishment of this which render it necessary to give both of the valves what is termed a "lead," that is, to open them in advance of the points indicated by the theory of the matter. And this is further complicated by mechanical considerations, so that, particularly in the case of very high-speed motors, the operation of opening the valves is something that is begun long before the completion of the respective strokes. The inertia of the valve itself and the opposing pressure of the retaining spring must both be overcome before the valve can begin to leave its seat. It is obvious that it cannot be forced open with a jerk and allowed to reclose with a snap, if smooth action and durability are requisites. This, of course, is a matter that bears more closely upon cam design, but it is evident that it closely affects the timing, as the necessity for opening and closing the valves progressively is important as bearing upon the time element. The easier the curve of the cam, the longer time will be required to lift the valve to the

full open point, and a correspondingly longer period will also be required for it to return to its seat. Naturally, this is also influenced by the extent to which the valve is lifted.

Before the advent of the automobile motor, the average stationary engine was designed to run at speeds varying from 150 to 300 r. p. m., the latter usually being the case with units of less than 12-horsepower and the former in engines over this power. As it was also customary to make the stroke considerably longer than the diameter of the bore, many Continental engines having a stroke of twice the bore, it is apparent that there was considerable leeway permissible in the matter of valve timing. On the other hand, many automobile motors are made "square," that is, the bore and stroke are the same, while in the great majority of instances, the stroke is seldom more than 10 to 15 per cent. greater than the diameter of the bore. In addition to this, few automobile motors are designed to run at much less than 1,000 r. p. m., and most of them at much higher speeds. An engine running at 300 r. p. m. is making 10 strokes per second; an automobile motor running at 1,200 r. p. m. is making 40 strokes per second, or a complete revolution for every .025 second, which means a stroke in every .0125 second. However, as the camshafts only turn half as fast as the crankshaft, they make one turn in every .05 second at 1,200 r. p. m., but when five hundredths of a second must be again divided into fractional parts in order to cause the opening of the valve to occur at the proper time, it is evident that only a slight divergence one way or the other is necessary to seriously impair the efficiency of the result, if not to prevent the proper functioning of the motor altogether.

Influence of Valve Design.

It is evident that the design of the valve itself must likewise be taken into consideration, but for present purposes it is merely necessary to touch upon it. Modern practice in automobile motor design favors the use of an inlet valve equal to one-fourth the cylinder diameter, and an exhaust of one-third the cylinder diameter, but as it is generally customary to make all the valves the same size to achieve interchangeability in this respect, a compromise between these two limits is usually adopted. With the mushroom type of valve on a seat with walls at an angle of 45 degrees, a lift equivalent to one-fourth of the valve diameter is required to give the theoretical full opening. That these figures are not closely adhered to by many designers is evident from the fact that not a few motors of 5 or 5 1-2-inch bore have valves of 2 or 2 1-4 inches diameter, with a lift of but 1-8 to 3-8 inch, the opening thus being fully 40 per cent. of the cylinder diameter and the lift less than 10 per cent. of the valve diameter, rather than 25 per cent. as above given. There is a tendency on the part of designers of high-speed motors to thus enlarge the valve diameter in order to reduce the lift, this being conducive to silent and easy running, as it eliminates to a great extent the hammering action of the valve in returning to its seat, beside insuring the quick and unobstructed passage of the gases and the elimination of wire-drawing of the fresh charge, which was troublesome in early engines.

But the question of valve diameter, lift and other important essentials connected with this part of the motor, is found to differ in such a great number of instances, and in some cases so radically, that it is only natural that a similar divergence should be found where the matter of timing is concerned, coupled with an equally great variety in cam profiles. It is needless to go further into this aspect of the subject here, as regardless of the great number of differences to be found and the varying standards followed, the underlying principles involved are the same in all cases.

The Necessity of Giving a "Lead."

As already mentioned, theoretically the inlet valve should be fully open for the suction stroke at the beginning of the downward travel of the piston on this stroke. How long before this point is reached the operation should commence, depends upon the speed of the motor, and is restricted by the consideration that the inlet should not actually open before the exhaust valve closes, as the burnt gases may either be blown out through the carbureter or some of the fresh charge from the latter drawn through the cylinder and out the exhaust valve. The closing of the exhaust valve and the opening of the inlet should accordingly be as nearly simultaneous as possible, and in the rough line sketches herewith appended, which are merely designed to furnish an outline of the necessity of giving the valves what is sometimes referred to as a lead, Fig. 1, which is intended to illustrate a motor at the beginning of the suction stroke, shows the former closed and the latter fully open. The piston descends the full length of its travel and at first sight it would appear as if the closing of the inlet valve should coincide with its arrival at the latter, but in addition to the mechanical considerations referred to in connection with the spring and valve, there are similar influences to be taken into account where the charge is concerned. The mixture of gas and air has both inertia and momentum; it does not rush into the cylinder the moment the valve opens, probably half the travel of the piston being required to get it well under way, but by the time the piston is at the bottom of its stroke, the gas has just attained considerable velocity and is pouring into the cylinder in considerable volume. On the other hand, compression of the freshly drawn-in charge does not begin to any extent the moment the piston reverses its travel. In addition to the almost incalculable period of time, speaking of high-speed motors, that it remains stationary at the bottom of the stroke before starting upward, quite an appreciable portion of the first part of the piston's upward travel is

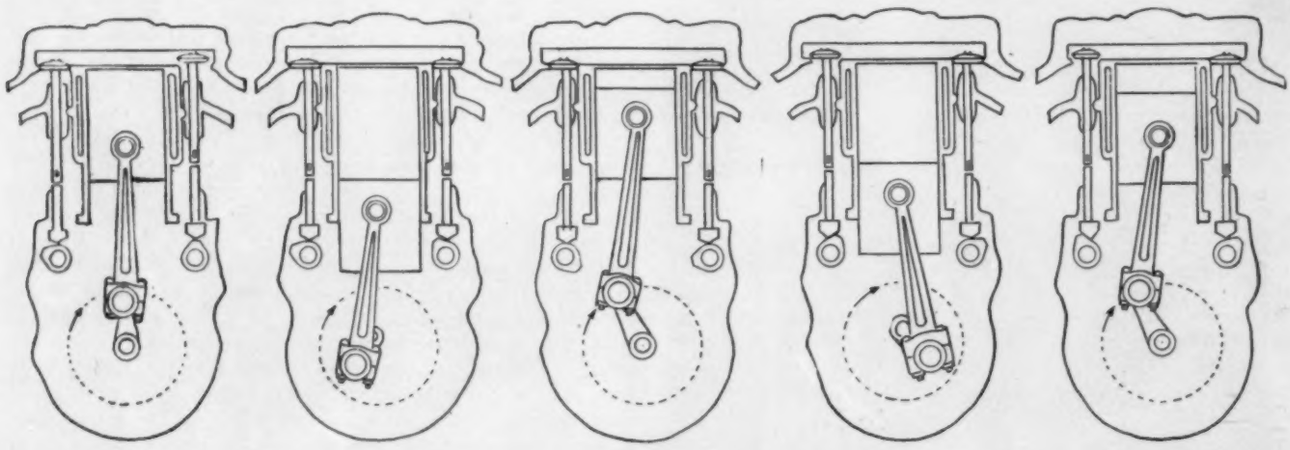


FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5.

required to create sufficient compression to overcome the velocity of the incoming gases. The point where these two forces exactly balance one another and where holding the valve open any longer would result in driving a part of the charge out again, is that at which the valve should close in order to attain the greatest efficiency. Fig. 2 illustrates approximately the distance beyond the lower dead center for which the inlet valve remains open. It is evident that if this should be caused to occur before or even exactly at the end of the suction stroke, the charge entering would constitute but a fraction of the total cylinder volume; the compression would be poor in consequence and the motor would develop but little power. Where the speed is very high, it is possible to make this point of closing as late as 20 per cent. of the compression stroke, but it is probable that the average allowance will be in the neighborhood of 6 to 12 per cent., or approximately 21 to 43 degrees on the crank circle, the measurement usually being made on the latter, and marked on the periphery of the flywheel.

The influence of advancing the point of ignition is considered subsequently, so that, assuming the compression and firing strokes to have been completed, the proper time for opening and closing the exhaust valve may next be taken up. In Fig. 3 are shown the approximate relative positions of the cams and crank during one part of the intermediate operations, those of compression and ignition, both valves being closed. The charge would be ignited at about the point shown with the spark well advanced and the piston would pass the dead center and travel downward on the power stroke. Before reaching the end of the latter, the exhaust cam would begin to lift the valve, as shown in Fig. 4. The necessity for this will be apparent when it is borne in mind that even at the end of the stroke the pressure in the cylinder would be quite high were it not relieved in this way. The object sought is to reduce this to atmospheric or less before the opening of the inlet valve, as the fresh charge cannot enter the cylinder unless this is the case. With the relative proportions given the standard automobile motor arising from space restrictions of the car—that is, the necessity of making the stroke but little longer than the bore in order to achieve lightness and minimum weight—it is impossible to expand the charge down to anything like atmospheric pressure as is done in stationary engines in which, as already mentioned, it is nothing unusual to make the stroke twice the diameter of the bore. Hence the exhaust valve must begin to open an appreciable distance before the end of the power stroke, varying with the speed at which the motor is designed to run.

This brings the sequence of operations to the last part of the cycle. The exhaust starts to lift from its seat before the crank reaches the lower dead center, as shown in Fig. 4, and for reasons already dwelt upon, it begins to close at a point which represents about an equivalent length on the crank circle before the termination of the upward or exhaust stroke, in order that its final closing may coincide or slightly precede the opening of the inlet valve on the beginning of the next cycle of operations immediately following it.

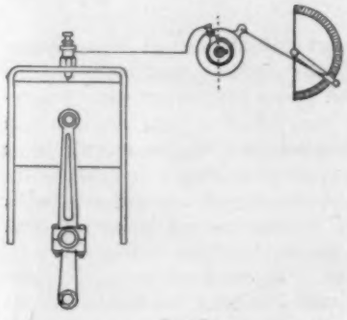


FIG. 6.

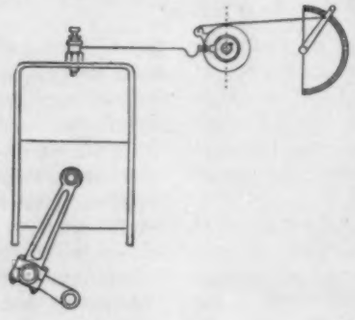


FIG. 7.

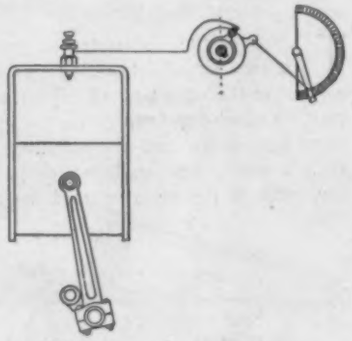


FIG. 8.

Advancing and Retarding the Ignition.

Whether there is any real necessity for advancing or retarding the point of ignition, is something upon which there is a great diversity of opinion, and the fact that there are well-known motors on the market which show a high degree of efficiency with a fixed point of ignition, merely providing a slight amount of retardation for starting purposes, serves to illustrate that there is sufficient ground for more than one well-founded conviction. It is a subject upon which volumes have been written and a great deal is being added to the discussion constantly. One fact has been pretty well established, and that is that the influences which make for the necessity of shifting the point of ignition are entirely alien to the motor itself, or at any rate, practically so. They are altogether electrical or mechanical reasons, such as magnetic lag of the iron core of the primary winding of the coil, inertia of the trembler, or of the parts of the make-and-break type of ignitor, and the like. The intention in the present article is merely to show what extremely important factors these seemingly trivial things are, and not to go into the technical side of the question as above outlined.

In order to make matters clear to even the novice, the illustrations are arranged to show the relative positions of the controlling lever and the crank, as well as their intermediary, the timer, which governs the point at which ignition shall occur with reference to the travel of the piston. In Fig. 6 is shown what may most aptly be termed a negative point. That is, the crank is on its upper dead center, corresponding to the neutral position of the controlling lever on the sector above the steering wheel. At this point, the ignition is neither advanced nor retarded; the spark would occur at the moment the piston reached the upper limit of its travel. That is, theoretically speaking, the influences already referred to would probably make it necessary to advance the lever quite a few degrees, varying with the speed of the motor to make the ignition occur at this particular point, but for the purposes of the illustration these are not taken into consideration. This position of the lever is that which the driver becomes accustomed to regard as the safest for starting. There is no fear of a back-kick, and at the same time, the ignition is sufficiently advanced for the first explosion to be sufficiently powerful to spin the motor and cause the remaining cylinders to take up their cycle.

In Fig. 7, though the lever is not shown quite to the end of the sector, this represents about the extreme point of advanced ignition, practically 45 degrees on the crankcircle. This is an extreme that is possible with a very high-speed motor, but advancing the ignition to such a point is something that is rarely done and would be more apt to retard the speed of the average motor than otherwise, if not to stop it altogether. The sole object of advancing the point of ignition is to produce the maximum force of the explosion at the beginning of the power stroke. The rate of flame propagation under compression is incredibly high, the maximum initial pressure in the cylinder being attained within a few hundredths of a second after the moment of ignition; nevertheless, it is not so high but that allowance must be

made for the time required. To realize this, it is only necessary to refer back to the figures given with regard to the amount of time required to complete a revolution or a stroke in the case of a motor running at 1,200 r. p. m., which is far from excessive, many motors such as those used in motorcycles running at 2,200 or over, while automobile motors are often designed to run at 1,500 to 1,800, which is not an extreme by any means. In consequence, though it takes but a few hundredths of a second to burn the charge, in that period of time the piston can have traveled an appreciable distance on the downward stroke, thus considerably weakening the effect of the explosion.

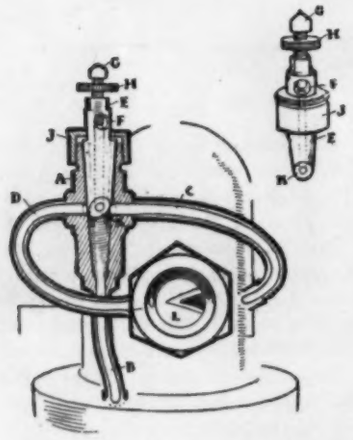
In Fig. 3 the extreme reverse is shown, the time of ignition being retarded practically to a point where the exhaust valve is about to open. The proper point for both ignition and valve opening to occur is usually found by taking indicator cards from the engine until positions giving the best results are shown. In a case such as that illustrated by Fig. 8, the card assumes a shape that may be likened to the outline of a club, with the large end where the termination of the expansion in a proper card usually comes, thus showing that ignition and in consequence the rise in pressure did not take place until the piston had almost terminated its stroke, the quick drop showing that the exhaust valve opened immediately afterward. Under such conditions, the motor would develop practically no power and by far the greater portion of the charge would issue from the exhaust unburned and would burn in the muffler. However, some of the old-time motors with automatically operated inlet valves could not be run at a slow speed in any other way.

To sum up, the standard automobile motor of the present day runs at speeds second only to those employed in small electric motors. It is, technically speaking, a high-speed motor, but its r. p. m. rate is very greatly in excess of anything that has been considered good practice in steam engineering in connection with the reciprocating engine, except in very small units for special purposes. Further, its working necessitates a greater number of operations involving moving parts than any other similar piece of machinery, and the rapidity with which they take place in a motor running at full speed is utterly beyond the human mind to grasp. A speed of 2,000 r. p. m. means that the piston completes 4,000 strokes in the course of 60 seconds; the inlet and exhaust valve each open and close 1,000 times; 1,000 charges are drawn in, compressed, fired and exhausted, all in the space of one minute. Even at half the speed mentioned, the mind fails to conceive the meaning of the time required for each operation; it is difficult if not impossible to realize what a hundredth of a second means. Hence, the necessity of timing the valves to the veriest nicety to produce the maximum efficiency from a given design of motor.

A DEVICE TO EQUALIZE CARBURETER PRESSURES

From *MOTOR* (London).

TO reduce the carbureter to its simplest form by restricting it to a single jet, a single air-inlet and a single method of control is the object of an invention of Messrs. Gillet and Lehman, to which has been given the title of a "controller." Experiment has shown that the incoming column of air can travel at such a speed that sufficient to properly oxygenate the charge can enter at the main inlet of the carbureter as at present constituted without the need of any other orifices. Then, the jet being properly proportioned to the engine capacity, it is obvious that a single source of fuel supply is ample. The throttle in the induction pipe virtually rarifies the air and the charge becomes attenuated; theoretically, this attenuation should act on the air and the gasoline alike, but in practice it does not do so, owing to the variation in pressures in the carbureter. At high speed the pressure in the intake falls to approximately thirteen pounds to the square inch; when entirely closed, the pressure between the throttle and the engine would fall further, probably as near to a vacuum as the tightness of the throttle and the pressure of the valve springs would allow. But in the jet chamber it would still be approximately atmospheric, from which it will be evident that the pressure on either side of the throttle is constantly varying, only being alike when it is wide open and furthest apart when tightly closed. However, the pressure on the fuel in the float chamber has remained constant at atmospheric, from which it is apparent that frequently the supply of fuel must be out of all proportion to the requirements. To overcome this, what is usually known as an auxiliary air-inlet was introduced a few years ago, its purpose being to equalize the pressure on either side of the throttle when the engine is running fast. Theoretically, the action of this inlet should be instantaneously suited to every stroke of the engine—something practically impossible. The Gillet-Lehman device provides properly proportioned communication from the induction pipe to the float chamber, the disturbing variation caused by the throttle being offset by taking one of the balance pipes from either side of the throttle. Thus each stroke of the engine acts instantaneously on the pressure in the float chamber, proportioning the flow of fuel to the draught of the intake.



SECTIONAL DIAGRAM OF DEVICE.

The device consists of a sort of three-way valve in the shape of a tapered plug; complete it measures but a few inches over all. It is designed to be tapped directly into the top of the float chamber, which must be made airtight with a gasket or washer under the cover, but in the case of the De Dion carbureter shown there was not sufficient room to apply it in this manner, and a small piece of tube B was used. Branching off from the center of the device are the "balance" pipes, both of which are led to the intake C at the jet side of the throttle D at the engine side. The taper plug E, which is hollow down through its center, and has a transverse hole F across its top, has two functions. A screw G controls the opening of F, and is locked by H. The plug E is clamped in position by the cap J. Air entering through F opens communication between the float chamber and the atmosphere. The second function of the plug is to act as an adjusting valve, controlling the opening of the orifices of the pipes C and D. Being cut on an angle, the end is the frustrum of a cone, and, in preparing to adjust the device to an engine, the plug is set so that it closes one-half the opening of each pipe. Then, if turned to the right, it increases the size of the opening of D and decreases that of C; turning to the left opens C and closes D, the relative proportions of the openings of the two pipes thus being varied to suit the engine. L is the sleeve throttle of the De Dion carbureter. A cap is made to screw over the device, completely encasing it, and may be sealed if desired. Assuming the device to be in place on an engine, it is adjusted as follows: F must be open in order to start, as otherwise the fuel could not flow; turning it sufficiently to permit the engine to run normally is the first adjustment, and G can be locked. Should closing F not stop the engine, air is leaking into the float chamber. The plug is turned until the engine misfires at slow speeds and then opened until the engine runs well, turning over slowly. The plug is then locked and the car tried, the adjustment being varied until satisfactory.

EFFECT OF THE CHARACTER OF THE SPARK*

By W. WATSON, D.Sc., F.R.S.

THAT a strong or "fat" spark is better than a weak one, when used to ignite the charge in a motor, appears to be a commonly accepted opinion, while there can be no doubt that in the case of most engines the power developed is considerably greater when the voltage of the ignition battery is well up to its normal value, than when the battery has run down, although the engine continues to fire regularly. Not feeling satisfied as to the cause of the above, and not being able to find the record of any direct experiments, the author has made the measurements recorded below.

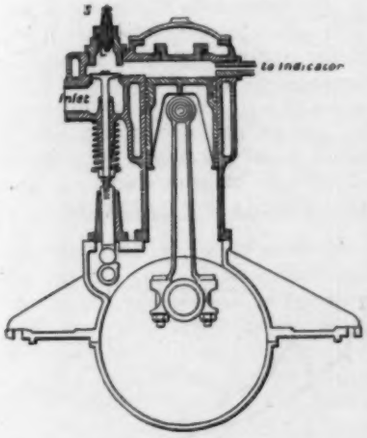


FIG. 1.

The engine employed is a double-cylinder one having a bore of 3.5 inches and a stroke of 4 inches. The inlet valve is mechanically operated, and both valves open into a pocket on one side of the cylinder head, as shown in Fig. 1. The sparking plug S screws into the cap used to close the hole over the inlet valve, the spark points being well inside a recess in this cap. All the experiments were made on one cylinder only, the other cylinder working with the trembler coil ordinarily employed with the usual four-volt battery. The speed at which the engine was run varied between 950 and 1,000 revolutions per minute. The primary of the coil used to fire the charge was connected to a commutator on the two-to-one shaft, a battery of ten volts, an adjustable resistance, and an ammeter. The commutator used was either a wipe contact, consisting of a steel wheel and fiber cylinder carrying a brass strip, or a make-and-break igniter.

The reason why a fat spark improves the working of an engine may be either (1) the development of a greater pressure in the cylinder owing to the quicker ignition of the charge, or (2) the more regular firing produced by the timing of the spark being more uniform. Experiments using a trembler coil at once showed that when the current in the primary of the coil is reduced, the time of firing is delayed, but that on advancing the spark more than usual, the mean pressure during the stroke can be brought back to the value obtained when the usual current is employed. As this indicated that the delay might be caused by the coil, the ordinary wipe contact was replaced by a make-and-break contact, while the trembler coil was replaced by a non-trembler one. As a result the delay, which with the trembler coil took place when the current in the primary was reduced, no longer occurred, this point being illustrated in Figs. 2 and 3. In each figure the indicator diagram (a) is taken with a strong current in the primary of the coil, and that marked (b) is taken with such a weak current that any further reduction in strength is followed by entire cessation of firing. It will be observed that the timing and the pressure developed are the same in either case, except that in Fig. 3 (b) an explosion has been missed, owing to the spark failing to pass, and the next explosion is much more violent than usual, owing to the scavenging which took place during the idle stroke. In Fig. 2 the sparking points were .25 mm. apart, and in Fig. 3, .5 mm. Diagrams were taken with the sparking points at .25, .5, and 1.0 mm. apart, but as no difference was obtained, only diagrams for a sparking distance of .5 mm. will be given in most cases.

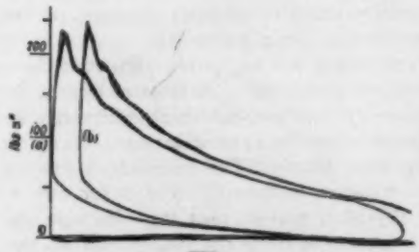


FIG. 2.

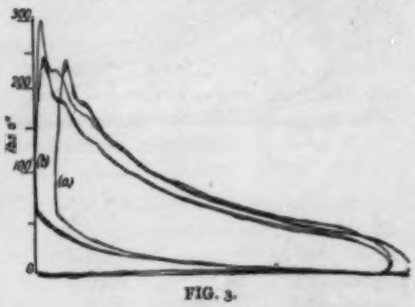


FIG. 3.

In Fig. 4 is shown the corresponding pair of diagrams when the mixture is very weak, a large excess of air being used. Here again, with the exception of some abnormal strokes following miss-fires, there is no effect produced by reducing the in-

* Abstract of a paper read before the A. C. G. B. I.

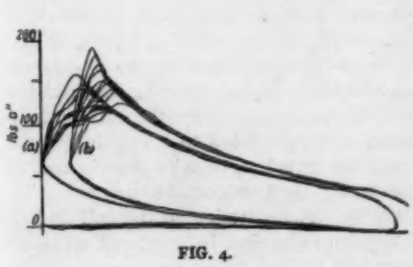


FIG. 4.

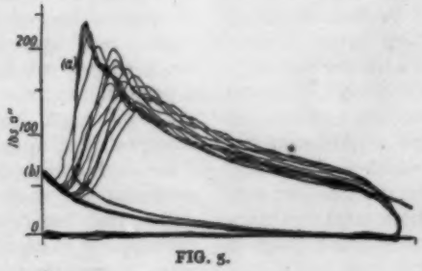


FIG. 5.

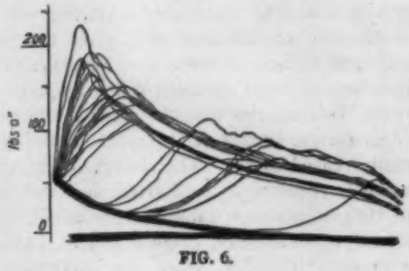


FIG. 6.

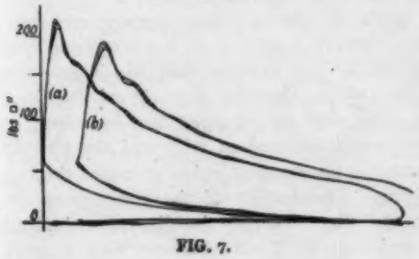


FIG. 7.

FIG. 8.

FIG. 9.

tensity of the spark. The above experiments indicate that it is not the weakness or "fatness" of the spark—at any rate, in this engine—which causes the loss of power that occurs when a trembler coil and a weak current are used. The kind of effect which is obtained with a trembler coil when the current is reduced, the carbureter being adjusted to give the best mixture, which for shortness may be described as a "full mixture," is shown in Fig. 5. In Fig. 6 the irregularity which may occur when a weak mixture is employed is shown, the diagram obtained with the normal current being omitted for clearness. It will be observed that the maximum pressure occurs at all sorts of points of the stroke between the normal and about 4-5 stroke.

The delay which occurs when a weak stroke is used with a trembler coil may be due to sluggishness of the trembler or to the fact that the trembler fails to act, the spark which ignites the charge being produced when the current in the primary of the coil is broken at the wipe contact. The delay which may be produced by lag of the trembler is shown in Fig. 7 for coil A and in Fig. 8 for coil B, and it will be seen that although the delay is appreciable the amount is quite regular, so that all the

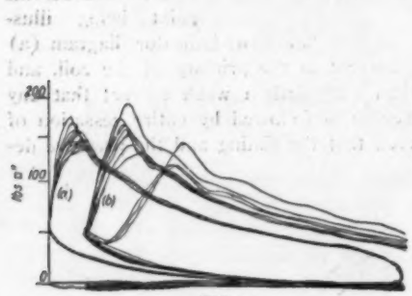


FIG. 10.

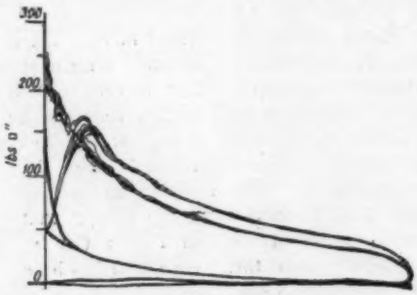


FIG. 11.

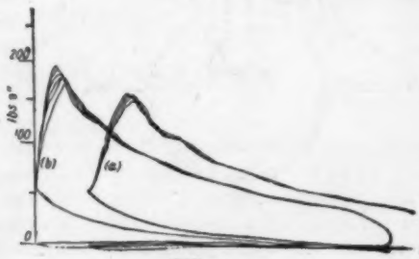


FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.

explosions occur at the same point in the stroke, and so the effect of the delay could, in the case of a single coil, be eliminated by slightly advancing the spark. As the current actuating a trembler coil is gradually reduced there is at first a small lag, such as that shown in Figs. 7 and 8, due to lag in the trembler, and then there is a sudden great increase in the lag. This increase is due to the trembler ceasing to act, so that the spark, in place of occurring shortly after the primary circuit is completed at the commutator, does not take place until the current is interrupted at the contact. When the current is below the critical value, holding the trembler against the upper stop produces no effect on the timing of the spark, showing that the trembler has really ceased to act. The change in current which at the critical value is required to pass from the state when the trembler acts to that in which it fails, is very small, in most cases less than a tenth of an ampere. Figs. 9 and 10 show the diagrams obtained with coils B and C when the current is first just above, and in the second case just below, the critical value.

That the size of the spark has no effect on the power developed was further shown by taking a number of indicator cards in which coil B was used, and the current in the primary was adjusted so that (a) the mean current was 0.6 ampere and the equivalent spark length in air was 5.1 mm., the trembler of the coil acting, and (b) when the current was reduced to 0.3 ampere, the trembler no longer acting, but the delay caused by the fact that the spark is now produced when the commutator breaks, the current being compensated by advancing the spark lever. The equivalent spark length in air was in this case 0.3 mm. The mean *I. H. P.* for four cards for each arrangement, taken alternately, was the same within the limits to which the diagrams could be measured; the fact that the speed of the motor was unaltered by the change in spark also indicating that the power developed was the same whether a large or small spark is employed.

From the results of the above measurements it would appear that the trembler, although it undoubtedly is an advantage when starting, is apt to introduce very considerable variations in the point of the stroke at which the charge is fired. Hence, on this account a plain coil with a make-and-break is to be preferred, particularly in the case of multi-cylinder engines having separate coils for each cylinder. The ill effects of the trembler will also be felt when a single coil with a high-tension distributer is used unless care is taken to keep the electromotive force of the battery well above the value required to give the critical current below which the trembler ceases to act. There is one disadvantage in the make-and-break, besides that due to the loss of power of starting on the switch, namely, that with some forms, unless the adjustment is just right, the blade may act as a trembler, giving a spark before the cam on the engine shaft finally breaks the circuit, so that pre-ignition is produced. This effect is shown in Fig. 11.

Since the power developed is not improved per se by the use of a "fat" spark, there are many advantages in using a coil which only gives a comparatively small spark, so long as the working of the coil is regular, for such a coil can be designed so that it only consumes a small current. The advantages of a small current are that, in addition to the economy in current, a point of importance where facilities for charging accumulators are not at hand, the wear on the points where the current is interrupted, due to sparking, can be reduced to a vanishing point. Thus, with a trembler coil the trembler, or with a plain coil the points of the make-and-break, need seldom be touched. The author feels confident that by suitably designing the coil and the commutator absolutely regular firing can be produced when the mean current does not exceed a tenth of an ampere.

To show that a fat spark, and hence a large current consumption, does not necessarily imply a good coil, a comparison was made between coils B and C, coil B being that which gave the fattest spark, and C that which gave the thinnest of the three coils tested. The two coils were so arranged that by means of two switches either coil could be used at will, and the current was adjusted in each case to the smallest value at which the coil would give regular firing. The results of the comparison are shown in Figs. 12 and 13. Fig. 12 shows the diagrams obtained with a full mixture, and Fig. 13 those obtained with a weak

mixture. In either figure diagram a is that obtained with coil B, the mean current being .6 ampere, while diagram b is that obtained with coil C, the mean current being .15 ampere. It will be noticed that coil C fires more quickly than coil B, probably owing partly to having a lighter trembler, and partly to the fact that its time constant is smaller.

The two diagrams shown in Figs. 14 and 15 are somewhat outside the scope of the paper, but may be of interest to drivers. They illustrate the advantage, as far as economy is concerned, of advancing the spark more than usual when employing a very weak mixture—that is, when driving with the extra air valve as far open as possible. Fig. 14 is that obtained when the spark is as much advanced as is advisable when using a full mixture, and the *I. H. P.* at 1,000 revolutions is 2.36. In Fig. 15 the spark has been considerably further advanced, so as to allow for the slow burning of a weak mixture, and as a result the *I. H. P.* at 1,000 is 2.76, an increase of nearly 17 per cent. in power, the consumption of fuel remaining the same. Something that will probably come in the nature of a surprise to the average driver.

SOMETHING ABOUT MOTORCYCLES.

Magneto Ignition for Motorcycles.—A strong tendency revealed at the recent European automobile shows was the adoption of magneto ignition for motorcycles. Almost every French and German manufacturer now fits a low tension magneto either as a part of the regular equipment or as an extra. In England the same tendency is observable, though in a rather less degree. The position of the magneto on many of the best European machines, among them Alcyon and Werner, is between the crank case and the front wheel, with drive by bevel gears. On the Werner, for instance, two small bevel wheels are fitted, one on the end of the magneto shaft and the other on the end of the half-time shaft, which crosses the front of the crank chamber. The two small bevels are then connected by means of one large bevel wheel. Another prominent French machine has the magneto placed transversely across the frame, between the lubricating oil and gasoline tanks. Even the very smallest light-weight French motorcycles, machines with a 1 1-4 horsepower engine, have the magneto as a part of their regular equipment for 1907.

Starting a Magneto-Equipped Motorcycle.—Replying to a correspondent who had experienced trouble in starting his motorcycle fitted with Simms-Bosch magneto, *Bicyling World* says that two matters should always be borne in mind. First, the spark plug contacts must be very near together. Secondly, the lever which advances and retards the spark must be in such a position that the break in the electrical current is made when the current reaches its maximum strength. In regard to the first point, it is allowable to have the spark plug points in magneto ignition very close, because that system gives a much better and stronger spark than with batteries; and that the advantages of a short spark gap are that it takes less voltage or potential to jump a short gap and will not short circuit with oil or soot as readily as when there is a long sparking distance. To get the best adjustment, put the rear wheel in a stand so that it may be pedaled. Disconnect the magneto wire which runs to the spark plugs and arrange a circuit so that there will be a spark gap between the high-tension magneto terminal and the frame of the machine equal to 1-8 or 3-16 of an inch. Mount and pedal at a uniform speed, shifting the lever at the same time until the hottest spark is obtained at the gap. Note this position of the timing lever, as it is here the maximum current is obtained, and always put it there in starting. In most machines the proper position is about three-quarters of the way towards highest speed. After the machine is started the spark may be retarded if desired.

BOOKS FOR AUTOMOBILISTS.

Baudry de Saunier's Annual.—Automobilists who have any connection with the trade in France or who are occasionally in need of information on events, men, firms, products, or expressions in the land of the automobile, will find the Annual Baudry de Saunier for 1907 a most valuable volume. The work is a kind of annual automobile encyclopedia of over one thousand pages arranged alphabetically for easy reference, and covers every phase of automobiling and the automobile industry. Should the reader wish to know the meaning of a certain technical expression, the address of some person or firm in the automobile business, particulars of the life of a speed king, the winner of a certain race, the names of tire or other manufacturers, etc., all that is necessary is to turn up the letter in the annual and full information, with drawings where necessary, will be found. The volume is carefully compiled, is brought up to date each year and is fully reliable in its information.

As an Aid to the Understanding of Electricity the automobilist will find "Electric Ignition for Motor Vehicles," by W. Hibbert, A.M.I.E.E. (Whittaker & Co., London) of very great value. The book contains the substance of a series of lectures to automobilists and deals with actual questions asked at these lectures. The elements of electricity are made clear, and the reader is introduced to the practical application of electricity on internal combustion engines. Batteries, commutators and coils, magnetic fields, multi-cylinder engines and synchronous ignition, faults, and magneto methods of ignition are all treated in a clear, concise manner and in such a way that even the novice cannot fail to obtain a good grasp of the subject. The chapter on magneto methods of ignition is thoroughly up-to-date, and deals with the principles involved and their practical application in Eisemann, Simms-Bosch and other well-known magnetos.

A New Question and Answer Book.—Compiling a book on the automobile in the shape of a catechism of stock questions and answers is an old idea borrowed from other fields and that has been made to do yeoman duty in this. A pleasing variation of it is to be found in the little volume just issued by the Gas Engine Publishing Company, Cincinnati, under the title of "Questions and Answers from the Gas Engine." The questions have not been formulated by the editors, but have been asked by progressive readers, and relate to the design, repair and maintenance of all kinds of gas and gasoline engines. They have been answered by recognized authorities, and from the great number which have appeared in the past eight years only those have been retained which are considered to have a permanent value.

Industrial Alcohol; Its Manufacture and Uses.—Under this title Munn & Company have just published a practical treatise on a subject which is at the present time occupying a great deal of public attention. It is written by John K. Brachvogel, M.E., and covers the making of alcohol thoroughly from the raw material to the final rectified product, besides containing numerous chapters on timely matters in connection with its use, such as the importance of tax-free alcohol, methods of denaturing, its utilization for light, heat and power, a statistical review and the Federal law on the subject in full.

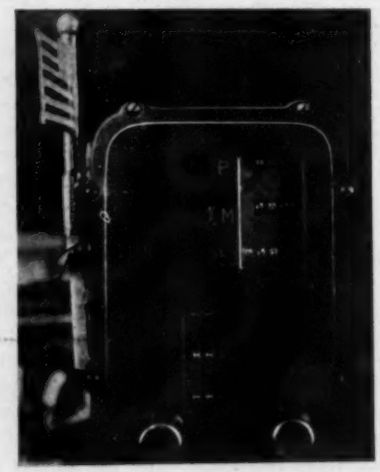
A Twentieth Century Hand Book.—Under the title of "Henley's Twentieth Century Book of Recipes, Formulas and Processes," the Norman W. Henley Publishing Company has just issued a handy volume containing information of value to those in almost any industry. It has been compiled by Gardner D. Hiscox, M. E., from the most authoritative sources to be found in each branch, and the information is set forth in such a manner as to make ready reference to everything pertaining to a certain subject available without tedious search.

HOW THE TAXIMETER TELLS ITS TRUTHFUL STORY

IN most European capitals the taximeter has entered into the daily life of the people and removed all cause for dispute between passenger and cab driver. In Paris, where the taximeter was first employed, every public vehicle, whether automobile or horse-drawn, is equipped with this trouble-saving apparatus. In London the taximeter is more rare, but the police authorities having issued an order that all automobile cabs in the British capital must be equipped with the apparatus after June 1, and the companies having the intention of putting large numbers of auto cabs into commission this year, the taximeter will certainly supersede the present distance system within a short time. There are signs that New York, at present at the mercy of rapacious cab drivers, will soon have the same liberty as is now enjoyed by Parisians and Londoners.

FRONT VIEW SHOWING AMOUNT OF FARE.

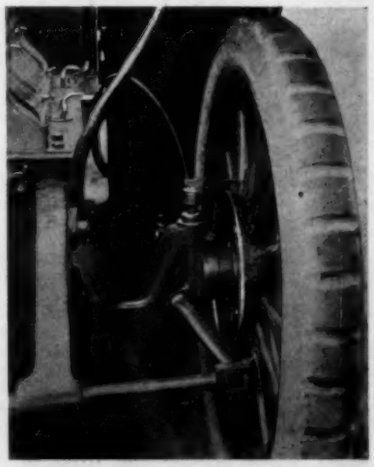
The accompanying illustrations will familiarize readers with the instrument which, once fitted on either horse or automobile cabs, will inevitably be adopted by every public vehicle in the city. The taximeter here shown is probably the only one at present in New York. It was made specially for service in this city and imported by the De Barres Auto Company, 589 Park avenue, where it is used on a 12-horsepower Delahaye cab of the type commonly employed in Paris and London. Though not plying for service, the cab has been running on New York streets for a few weeks, and its metal box surmounted by an American flag has excited interest and curiosity.



REAR OF TAXIMETER IS A TOTALIZER.

The face of the apparatus has four sets of figures—in the top left hand corner appears either tariff 1, tariff 2, or "Panne," the French word for a breakdown. Below are two openings, showing in dollars and cents the fare to be paid. At the foot of the indicator are registered the extras. The minimum fare is 50 cents, and this sum is always indicated whether the vehicle is in service or not. When a passenger enters the cab the driver lowers his flag and the machine begins its silent but unfaltering task of measuring the distance traveled and indicating on the dial the fare to be paid. This is performed in much the same way as speed and distance are measured by a speedometer, a flexible cable connecting from the indicator to the front wheel of a motor-driven vehicle or the rear wheel of a horse cab.

In one important particular the taximeter differs from a speedometer. For instance, should the cab be stopped either for a block in traffic or for the making of a call, a clockwork mechanism within the apparatus advances the figures at regular intervals, making the cost the same for a given time whether the cab be running continuously or intermittently. Experiments have been made with the Delahaye taximeter cab over different routes in New York, each one being accomplished at various rates of speeds, straight running, or intermittently fast and slow, the result being that the fare for a given distance was always the same no matter how that distance had been covered, provided the speed had not fallen below five miles an hour. Four runs were made from the Café Martin to Park avenue and Sixty-third street, one at high speed, another at a moderate speed and a third alternately fast and slow to suit traffic conditions. The average time for this run was then taken and the taximeter set in motion by lowering the flag, the auto not moving, for this period. All four fares were practically the same. It is useless to give figures, for no definite tariff has yet been fixed upon for a New York service.



TAXIMETER CONNECTION TO WHEEL.

All that the passenger has to concern himself about are the figures on the dial. On leaving the vehicle he pays the amount indicated. If more than two people enter the cab the driver turns tariff 2 into view, this registering a minimum 50 cents fare for a shorter distance. Should he be asked to go out of a certain defined district, as, for instance, above One Hundred and Twentieth street, over the Hudson or the East River, the driver will, before starting, indicate the extras to which he is entitled according to a fixed tariff, by operating a push button at the rear of the apparatus. If the machine has a temporary breakdown, the driver turns his tariff square over to "Panne" during which time no change is made on the fare dial, though the amount of time thus lost is indicated on the rear of the apparatus. The repair finished the driver turns his tariff back from Panne to tariffs 1 or 2, as before, and the journey is resumed as if nothing had happened. On the completion of the journey he raises the flag, the extras turn back to zero and the fare dial again registers the minimum of 50 cents. The total distance traveled with the taximeter in operation, the total for extras and time spent making repairs while on a journey are all shown at the rear of the apparatus, and serve as a check between the driver and the company owning the vehicle. A profit-sharing system is generally adopted between driver and owner.

From advice received from London it appears that the metropolitan cabby, who a few weeks ago was denouncing the taximeter as an infernal machine, is now thoroughly converted to its value, for, although under no legal obligation to do so, he is having his vehicle equipped with the instrument. Automobilists declare that this sudden enthusiasm is but a cute move to buy up all the instruments on the market and thus keep the automobile cabs off the streets for a little time longer.

LETTERS INTERESTING AND INSTRUCTIVE

The Gearless Car Again Specifically Considered.

Editor THE AUTOMOBILE:

[639.]—Has there ever been built a real gearless gasoline automobile—one in which there is no change-speed gear nor any equivalent means for varying the rotational ratio between the motor and the driving wheels? If not, how nearly has this ideal been approached in practice, and what is the best engineering opinion as to its ultimate complete realization?

Spokane, Wash. JOHN C. PERKINS.

Several years ago a prominent French automobile manufacturer built a car propelled by an eight-cylinder engine without gears, except for reversing, but this car never was run enough to demonstrate any really practical qualities. Since then the Napier people, of England, and the Oldsmobile concern, in this country, have achieved some remarkable runs solely on the high gear—which amounts to a substantial equivalent of the gearless ideal, while the Napier people are understood to offer their six-cylinder cars, optionally, without change-speed gear. Of equal, if not of greater significance, as showing the tendency towards gearlessness, is the practice of the Ford company, which makes a six-cylinder touring car in which the drive is through a two-speed planetary gear affording on the low gear only double the engine revolutions that are provided for a given speed on the high. This can mean nothing less than that if the flexibility of present engines could be merely doubled—by no means an impossibility—a car could run gearless quite as well as the Ford runs with its two-speed gear. And it is a fact that the Ford, while expected to run ninety-nine one-hundredths of the time on the high gear, is no more subject to "stalling" than any modern car of similar weight and power. The whole question resolves itself into one of gasoline-engine flexibility, and a very little progress in this direction may bring about the elimination of the speed changes from many cars. How soon this progress is to come is another question, there are many very serious difficulties in the way of it, but more serious difficulties have been overcome. Without going into a more lengthy discussion of the subject than is pertinent to the purpose of this page, it may be said that the matter is one of torque range rather than of speed range. Engines now are made that will *run* as slow as 100 and as fast as 2,500 revolutions a minute, but an engine that will *pull* at all speeds from 150 revolutions to 2,000 revolutions will solve the change-speed-gear problem. Some interesting material on this subject will appear in the course of a series of articles on some trends of modern automobile design.

The Prevention of Carbon Deposits.

Editor THE AUTOMOBILE:

[640.]—Will you kindly tell me under the head of "Letters Interesting and Instructive," the best way to prevent carbon deposits from forming on the cylinder heads and pistons of an automobile motor? I am careful to use the proper mixture of gas, as well as good oil and not too much of it, but the carbon forms just the same. SUBSCRIBER.

Baltimore, Md.

It is difficult to add anything to such a general statement as you make. By using the correct mixture and the proper quantities of the right sort of lubricating oil, you are doing practically the only things that can be done to prevent the formation of carbon, but you do not throw any light on the extent to which you are troubled by the latter. It is usual to run a motor for an entire season without any undue trouble from this cause, such as preignition, while others, with apparently an equal degree of care, require cleaning much oftener. If you will describe your trouble more in detail it may be easy to suggest a remedy, or probably some other autoist who has had exactly the same experience may be able to come to the rescue and help you out.

More About Wiring Dry Cells for Auto Use.

Editor THE AUTOMOBILE:

[641.]—In your answer to Mr. Stark, of Concord, N. H., in "The Automobile," issue February 21, 1907, you state that with a battery of ten cells connected up in two groups of five cells, he (Mr. Stark) would "get the voltage of five and the amperage of ten cells." Now, I claim that you would get the voltage of five and the amperage of two. Consider ten cells as above, but connected in parallel, that is, positive to positive and negative to negative. You would, of course, have the voltage of one cell and the amperage of ten; that is, the effect would be the same as if we had one cell of ten times the electrode surface, that is, 1-10 of the internal resistance; and on a short circuit, or circuit of low resistance, we would obtain approximately ten times the amperes or quantity of current.

Again, consider the same ten cells arranged in two groups of five each. In this case we have the voltage of five, as five cells have been joined in series, positive to negative, and the quantity of two, for the electrode surface is doubled, that is, the internal resistance is halved, so on a circuit of low resistance the current (amperes) is doubled. To produce an amperage ten times as great as one cell would require ten cells connected in parallel, and to produce a voltage five times as great as that of one cell would require five cells connected in series, so that to produce a voltage of five and amperage of ten would require fifty cells connected in series—parallel ten groups of five each. A. R. BLISS.

Lowell, Mass.

Upon referring to the letter you mention, though the diagram submitted in connection therewith is no longer available, it is evident that our correspondent was somewhat in error in stating the output of his dry cells, and this error was inadvertently repeated in our answer. It should have read in both cases as "the voltage of five and the amperage of *two* cells," instead of ten, the makers of the car in question equipping it with twenty cells wired in two series-multiple connected sets, so as to give the voltage of five cells and the amperage of two on either point of the two-way switch. Your statement of the case is quite correct, and we are gratified to note the readiness which our correspondents display in detecting such oversights.

Simplification of Screws and Nuts.

Editor THE AUTOMOBILE:

[642.]—I have a sugestion to make, as from a user to the builders of cars, on which I would like your criticism. Take the average car, even of best quality, and it is a recognized fact that it is in at least some degree subject to breakdown on the road, as often as not involving the repair, replacement, or transference of some bolt or nut. Usually, however, there are not in the tool box bolts and nuts of every size used on the car, since this would involve carrying too many. And the other emergency means of extemporizing a repair—by the removal of one of these small but vital holding elements from an unimportant to an important point—is usually blocked by the same fact that makes carrying a complete set of replacements impracticable—the variety is such that the ones to be had do not fit. Now why would it not be well to reduce this variety and build a car with, say, absolutely no more than three different sizes of bolts and nuts in its whole construction? Would this involve anything more serious than the occasional use of a nut, for instance, considerably large for the stresses to be sustained by it, but not enough so to be really objectionable in point of weight, size, or otherwise?

Kenosha, Wis. LAWRENCE B. CLAFLIN.

Your suggestion undoubtedly is one of great merit, and if it could be brought into vogue with the manufacturers of the leading cars, there is no doubt but what it would greatly facilitate repairs of all kinds, not only by facilitating "robbing" of one car or part to fix up another, but also by reducing the variety that the average small repair shop would have to stock. In the new standard adopted by the Association of Licensed Automobile Manufacturers for "Hexagon Head Screws" and "Castle and Plain Nuts" there are eleven sizes included—1-4, 5-16, 3-8, 7-16, 1-2, 9-16, 5-8, 11-16, 3-4, 7-8, and 1 inch. To reduce these to the three you suggest there

might be retained only the 3-8, the 11-16, and the 1 inch. This would involve the use of nothing smaller than 3-8, even in cases where the 1-4 or 5-16 might fulfill all strength requirements. Likewise, for anything requiring greater strength than the 3-8 would afford, the 11-16 would have to be used, even if excessively heavy for the duty required of it. And the 1 inch would have to be used arbitrarily in place of the present 3-4 and 7-8 sizes. Probably, everything considered, four sizes would be better than three, but this is a mere minor detail, and it is a fact that there is less occasion than might be imagined for the greater variety. A car with only three —or four—bolt sizes would be almost ideal in this respect, and if the manufacturers have any really sound reason for not building it, now that the suggestion has been made, these columns are open to their opinions, which we all will await with interest.

The Control of the Emergency Brake.

Editor THE AUTOMOBILE:

[643.]—Which is at present the most approved practise, to have emergency-brake levers apply by forward or backward movement? And what are the advantages of each system?

Juarez, Mexico. ENRICO GOMEZ.

There seems to be somewhat of a preponderance in the case of the most-expensive and presumably best-designed cars in favor of the rearward movement to apply, so that the driver pulls the brake lever towards him to stop the car. Apparently, however, the difference is more a matter of individual preference than of anything else, since there are those who believe strongly in and argue vigorously for each construction. Drawing the brake towards one is claimed to be, and in a manner seems to be, the natural movement, since with it the feet can be braced against the toeboard, or the clutch and foot-brake pedals. On the other hand, if the forward movement is adopted, the brake lever always is in most convenient position to grasp without leaning forward or groping, while it is further claimed that the shock of sudden stopping—the condition for which the emergency brake is supposed to be used—throws the driver forward against the brake lever, and in this way applies it the harder.

A Puzzling Carbureter Ailment.

Editor THE AUTOMOBILE:

[644.]—As a subscriber in your excellent weekly, I appeal to your columns for a bit of advice. I have a 1 1-4-inch Schebler carbureter on my 20-horsepower, four-cylinder runabout, which has never quite given me entire satisfaction. The engine, when running at slow speeds in a closed throttle and retarded spark, misses fire in a very erratic manner. No particular cylinder is always responsible, but it skips about with all of them taking their turns at misfiring—the two end ones more often offending. After a vain attempt to eliminate the trouble by carbureter adjustment, I turned my attention to the ignition. I replaced my old wires wih new Packard cable throughout; installed a new set of plugs; cleaned the contact points on the timer; carefully inspected the vibrators, assuring myself that they were in perfect condition; had my storage cells recharged, and even tried new batteries, but still with no improvement. Satisfied with the condition of the ignition system, I next took down the carbureter and cleaned it out thoroughly. With the other débris which had lodged at the gasoline inlet, I removed the body of a large fly, and my hopes ran high that I had located the trouble at last.

But still the engine behaved as before. When pulling the car at all speeds from twelve miles per hour to the maximum she acts splendidly, each cylinder hitting as regularly as the clock. In fact, the car is a little wonder on the road, and answers the throttle with remarkable celerity.

But immediately I begin to reduce the speed below twelve—which necessitates closing the throttle entirely and retarding the spark—the misfiring recommences and the machine is often propelled in jerks.

I have spent three months trying to adjust that carbureter properly. If I arrange it so that the engine will hit regularly at the slowest speed, it will not race, for lack of sufficient air; and when the needle valve and air intake are adjusted for high efficiency at the maximum speed (1,400 revolutions), as I now have it, she absolutely will not fire steadily at the other extreme.

This is particularly obnoxious when on a crowded thoroughfare. When it becomes necessary to drive behind a file of ice wagons moving at a snail's pace my engine endeavors to amuse me with a horseless imitation of an amarillo broncho bucking along on one, two, or three "legs."

I would like to have some advice from your valuable paper upon a means of correcting this fault. Is it not possible to secure a richer mixture at slow engine speeds by raising the float level in the carbureter? My idea is that with a higher level a less amount of suction is required to draw a proper amount of gasoline from the nozzle. Do you think this change would help me? I had thought, too, of partially closing the main air intake hole. As you know, this stands open permanently, regardless of the position of the auxiliary poppet valve. It is about 3-8 inch in diameter and admits a lot of air. It is clear to me that the mixture is too weak at slow speed, for when I lay a card over the air intake and gradually slide it over the opening, at a point when it is very nearly closed, the engine begins to fire regularly and perfectly. Can you help me in this case? I assure you that your assistance will be greatly appreciated. DICK WILES.

New Haven, Conn.

As you state toward the end of your letter, you have located the trouble beyond a doubt by partially closing the main air intake of the carbureter, upon which the engine will run satisfactorily at low speeds. The only thing that remains to be done is to provide a means of supplying a mixture of the character indicated by your experiments. We should not recommend raising the float level considerably to do this, as trouble will doubtless result when running at full speed. Before making any radical changes we should recommend laying your experience before the makers of the carbureter, as this is a rather unusual action for any modern type of compensating carbureter, in view of your statement that no amount of adjustment suffices to correct it. In case no relief is forthcoming, we should suggest fitting a slide or other means of closing the main air intake and inter-connecting this with the throttle, so that when the latter is closed the air supply will also be cut down proportionately and the engine run slowly without missing, as it does when this opening is almost closed with a visiting card, as you relate.

Formulæ for Figuring Rating of Different Types.

Editor THE AUTOMOBILE:

[645.]—As I am a subscriber, I would appreciate it very much if you would give me a reliable formula for figuring horsepower. I notice in Brooks handbook the following is given:

$$\text{H.P. equals} \frac{D^2 \text{ times } S \text{ times } N}{18{,}000} \text{ for four-cycle motors}$$

and

$$\text{H.P. equals} \frac{D^2 \text{ times } S \text{ times } N}{21{,}000} \text{ for two-cycle motors}$$

in which D is the diameter of the cylinder bore, S the stroke, and N the number of revolutions. I don't think this can be right, as a two-cycle motor would then have less power than a four-cycle of the same size. Please give me your opinion on this.

Oregon, Ill. F. R. ZIEGLER.

The formulæ you cite from Brooks are based upon an assumed mean effective pressure, dependent upon the grade and character of fuel used. They are also given by Roberts in his Gas Engine Hand Book, but the denominators there used are 18,000 for the four-cycle and 13,500 for the two-cycle type of engine. In other respects these authorities agree. Roberts gives the following method for determining this denominator, the performance of an engine of the same kind and working on the same quality of fuel being already known. Let X be the unknown denominator; then,

$$X = \frac{D^2 \times L \times R}{\text{B. H. P.}}$$

He further states that the above formulæ have been well borne out in practice for the best performance of the average gas engine. We think the old steam engine formula, given in last week's issue of THE AUTOMOBILE in response to letter No. 620, is more satisfactory for both four and two-cycle engines. As to your last question, it is generally conceded that the average two-cycle engine does not actually develop as much as a four-cycle engine of the same dimensions, due

to the imperfect scavenging of the cylinder, the difference being about that indicated by Brooks in his formula. We are aware that this goes counter to the theory of the matter, some makers even claiming that the two-cycle engine will develop twice as much power as a four-cycle of the same dimensions, but this is not borne out.

Information Regarding Front-Driven Cars.

Editor THE AUTOMOBILE:

[646.]—Kindly answer these questions in "The Automobile"; (1) Where can I gain any information concerning front-drive cars—Christie's especially? (2) Is it front or back steering? (3) How is the gear-changing performed? (4) What is meant by a two-throw crankshaft? (5) Were there any pictures and description of Christie cars in any former issues of "The Automobile," and will there be any later on? FRONT DRIVE ADMIRER.

Bayside, N. Y.

(1) In speaking of front-driven cars, we presume you confine yourself to those of the gasoline type. While a number of cars of this kind have been built by investigators, so far as our knowledge goes the Christie is the only one that has been developed to the extent of building more than a single car.

(2) It is front steering and as originally designed (the racing car) was both front and rear-driven.

(3) We believe the change-speed gear is of the sliding type, giving a single speed forward and reverse, and is located inside the crankcase and driven by a large gear fixed to the crankshaft between the pairs of cylinders and engaging a small pinion on a parallel shaft, which is in turn geared to pinions directly attached to the front wheels. This gives the slow speed for starting, the direct drive being by means of clutches at each end of the engine, so that on the high the motor is directly turning the road wheels.

(4) Throw is commonly accepted as a synonym for crank, so that a two-throw crankshaft would be one having two cranks regardless of their placing, and the crankshaft of the standard type of motor would accordingly be termed a four-throw, though its two pairs of cranks only lie in two different planes. In some instances the word appears to be used with reference only to cranks placed at different points on the circumference, so that, taking this meaning as the correct one, the usual four-cylinder crankshaft would be denominated a two-throw crankshaft. We believe current usage, as long established in steam engineering practise, favors the first meaning referred to.

(5) The Christie car has doubtless been described in THE AUTOMOBILE, but it is so long ago that the issue is out of print. The Christie racing car for the Grand Prix will be described in the near future.

Information Wanted Regarding Primary Cells.

Editor THE AUTOMOBILE:

[647.]—I would be pleased to have you tell me through your "Letters Interesting and Instructive": (1) How dry cells are made; that is, what materials are used, and in what proportion, and how. Are there many ways to make these cells? (2) What materials are used in a wet battery? Please give several ways of making these if there is more than one way.

High River, Alta., Canada. E. H. SCHROEDER.

(1) The composition of the dry cell was explained to some extent under the head of "Sources of Ignition Current," which appeared in the issue of THE AUTOMOBILE of February 21. The positive element is made of sheet zinc forming the containing case; in this is placed a rectangular piece of carbon slightly less in width than the diameter of the container. It rests upon a piece of wood or other insulator, so as not to short-circuit the cell by coming in contact with the zinc. Between the carbon and zinc is packed manganese dioxide, or some other depolarizing material, and a special paste, sawdust or other absorbent. The cell is filled level with the top of the case and a solution of 25 to 30 per cent. sal-ammoniac and water is then poured on the contents until the cell has taken up all the liquid it will hold. It is then sealed with pitch or similar material, one or two small holes being left for vents. This is substantially the way used in making these cells by the majority of makers, so far as we know, but all the large manufacturers of dry cells have special formulæ and methods of their own, which are trade secrets. We should not advise any amateur to attempt to make dry cells, as they can be had at a fraction of what it would cost, the result of the home process also being doubtful.

(2) It would require a large-sized volume to satisfactorily answer your second question. There are hundreds of types of what you call wet batteries, technically known as primary cells, and it will depend entirely upon what service you wish to use them for. If for ignition, the Fuller bichromate battery will work well on a slow-speed stationary engine, but is not suitable for automobile or boat work, owing to its bulk and weight, as well as its tendency to polarize quickly on closed circuit. Jars measuring about 6 by 8 inches are used, the elements consisting of a large flat plate of carbon and a small cone of zinc, weighing about a pound and a half, and with a connecting wire cast in it. The zinc is placed in a porous earthenware jar about 2 1-2 inches in diameter which is set in the center of the glass jar. A dilute solution of sulphuric acid and water is poured over the zinc and the remainder of the cell outside the porous jar is filled with a solution of bichromate of potash, sulphuric acid and water. This is made by dissolving about half to three-quarters of a pound of bichromate of potash in two quarts of hot water. After it has cooled, one part of sulphuric acid to every ten parts of water is added and the solution again permitted to cool. It is then ready for use. The e.m.f. of this type of cell is about two volts, or slightly over when fresh; it is largely used for telephone service. But, as already stated, it is but one of hundreds of different types. Zinc, carbon and a sal-ammoniac solution in a glass jar is probably the simplest form of open circuit cell, but any of these batteries can be bought much cheaper and much better than they can be made at home.

Formulæ for Calculating Torque.

Editor THE AUTOMOBILE:

[648.]—Will you kindly give me, through your journal, under the heading "Letters Interesting and Instructive," a formula for determining the torque given to a shaft on shaft-driven cars; also the torsional strength of .30 carbon O.H. steel and nickel steel shafts for different lengths? INQUIRER.

Plainfield, N. J.

Let a horizontal shaft of diameter D be fixed at one end, at the other or free end, at a distance L from the fixed end, let there be fixed a horizontal lever arm with a weight P acting at a distance A from the axis of the shaft, so as to twist it; then Pa=the moment of applied force.

Resisting moment=twisting moment=$\frac{SJ}{c}$ in which S=unit shearing resistance, J=the polar moment of inertia of the section with respect to the axis, and c=the distance of the most remote fiber from the axis, in a cross section. For a circle with a diameter d,

$$J=\frac{\pi d^4}{32}\ ;\ c=\tfrac{1}{2}d$$

$$Pa=\frac{SJ}{c}=\frac{\pi d^3 S}{16}=\frac{d^3S}{5.1}=.1963\,d^3S;\ d=\sqrt[3]{\frac{5.1\ Pa}{S}}$$

The torque or twisting resistance of a shaft may then be calculated as follows:

$$T=\frac{\pi}{16}d^3S=.1963\,d^3S,\ \text{whence}\ d=\sqrt[3]{\frac{5.1\ T}{S}}$$

In which T=torsional moment in inch-pounds, D=the diameter in inches, and S=the shearing resistance of the material in pounds per square inch. If a constant force P were applied

to the end of the horizontal lever (in the case of a crankshaft, the crankpin) tangentially to its path, the work done per minute would be:

$$P \times L \times \frac{2\pi}{12} \times R = 33{,}000 \times \text{I.H.P.}$$

In which L=length of the crank in inches, and R=revs. per min., and the mean twisting moment $T = \frac{\text{I. H. P.}}{R} \times 63{,}025$. Therefore,

$$d = \sqrt[3]{\frac{5.1T}{S}} = \sqrt[3]{\frac{312{,}427\ I.H.P}{R.S.}}$$

The forgoing formulæ are given by Kent. We cannot answer your last question on the data you give, as the phosphorus content of the steel has a most important bearing upon its strength. You would be more apt to get definite information by inquiring of steel makers of the class of material usually supplied. for this purpose, with its specific characteristics.

Two Thousand R. P. M. for Two-Cycle Engine.

Editor THE AUTOMOBILE:

[649.]—I am about to build a four-cylinder two-cycle engine, and would like to have your opinion on these dimensions: Bore, 5 5-8 inch; stroke, 5 1-2 inch; inlet port, 1-2 inch; exhaust port, 3-4 inch, both ports running half way around the cylinder; compression space, 1 5-8 inches, to be fitted with rotary valves in the crank-chamber; connecting rods, 12 1-2 inches Do you think that this engine will turn up 2,000 r. p. m.? SUBSCRIBER.

Buffalo, N. Y.

From the query at the foot of your letter regarding the speed to which this engine will turn up to, we are led to infer that it is your object in designing it to produce a high-speed motor. In such a case, the inlet and exhaust ports are much too narrow. It is doubtful if a motor of the cylinder dimensions you mention, could be made to turn 1,000 r. p. m. with ports of the size given, and its normal speed would be nearer 500. Of course, it might be raced to up to 2,000 r. p. m. without load, but it could not develop any power at that speed. Making the inlet port 3-4 inch and the exhaust 1 inch would give more suitable proportions and probably it would be found advantageous to increase these dimensions still further, making them 7-8 and 1 1-8 inches respectively, and an increase in the compression, or, in other words, a decrease in the clearance, which we presume you mean by "compression space," would also be desirable. There is no reason why a properly designed two-cycle engine cannot be made to turn up to 2,000 r. p. m.

How to Procure a License as Chauffeur.

Editor THE AUTOMOBILE:

[650.]—Will you please tell me how I can get a license to run a car? I am a driver in New York State, and have worked in a repair shop for one year. F. E. FLYNN.

Fulton, N. Y.

Write to the Secretary of State, Albany, N. Y., for application blanks. Fill out and return with the customary fee and the license will be granted. The formalities required are merely a statement of the applicant's name, address and the names and types of vehicles he is experienced in operating.

Information Wanted on Exhaust Horns.

Editor THE AUTOMOBILE:

[651.]—I wish to make an exhaust-blown horn, but am unable to find any literature that would enlighten me on the size of the reed. It is to be 5-8 inch wide, and between 2 and 3 inches long. Of what gauge spring brass should I make it, and how long, in order to get a deep bass note? E. F. McNUTT.

Youngstown, Ohio.

This is apparently a case where nothing but the "cut and try" process will aid you, unless you can get some maker of this kind of horns to unbosom himself on the subject and give you the result of his experience. Failing the latter, you will have to go ahead and design an experimental horn and see how it works, correcting the faults that may appear until you are satisfied with the result. We presume the thickness of the spring brass required will depend very largely upon the amount of pressure to be used, not to mention other equally important factors.

Proper Amount of Lift for Valves.

Editor THE AUTOMOBILE:

[652.]—On a 4 x 4 double opposed auto engine, mechanical exhaust, automatic inlets, how far should the exhaust open, measuring 1 inch or 1¼ inches at opening? J. G. BENEDICT.

Coin, Iowa.

With the mushroom type of valve, which is in practically universal use on automobile motors, it is customary to figure on giving the valve an amount of life equivalent to one-fourth of its diameter. This gives the theoretical full opening of the passage closed by the valve; no advantage is to be gained by giving it more lift than this, and less will tend to choke the engine, according to the extent to which the passage is reduced. Hence the proper lift for the exhaust valve of the engine you mention should be one-fourth inch.

A CORRECTION FROM MR. MATLACK.

Editor THE AUTOMOBILE:

[653.]—In your issue of February 21, under the head of "Letters Interesting and Instructive," you printed my letter No. 591, referring to compression and compression space, method of computing. Will you look over my original letter and compare my method with that which appeared in the above issue? I think you will find that I denote the total volume by V (large), and compressed volume by v (small). You also have X equals (Vt plus 460 times 0.002 times 14.7 minus 14.7 equals increase in pressure. But it should be X equals (Vt times 0.002 times 14.7 minus 14.7 as Vt equals 840 plus 460 equals 1300.). And on the twenty-seventh line you have the word "compressure"; it should be "compression." Also, you have

Compression Pressure equals $\frac{\text{v times 14.7}}{\text{V}}$ It is $\frac{\text{V times 14.7}}{\text{v}}$

These corrections agree with my copy. R. C. MATLACK.

Chicago, Ill.

THE OLD STORY OF PRACTICE VS. THEORY.

Editor THE AUTOMOBILE:

[654.]—No. 607, who signs himself Louis Ruthenberg, causes me to wonder where he got his information as to the practical side of the friction drive. I own a Model 5 Lambert automobile, and from what follows I have demonstrated to my own satisfaction that the Lambert friction drive is all right. This car has carried five grown people and two children up a 25 per cent. grade and six grown people and nine children up a 10 per cent. grade. This same car has plowed through Illinois mud four to six inches deep for eighty miles, averaging nine miles an hour. It has also plowed through Illinois and Iowa sand with the same up to the chains on the sprocket wheels. My first or "greenhorn" paper wheel lasted 1,700 miles in a hilly country. These tests were made with the regular 16-horsepower engine. F. W. STEWART.

Princeton, Ill.

JUST A BIT OF FACETIOUSNESS.

Editor THE AUTOMOBILE:

[655.]—Apropos of some of the inquiries made in your correspondence department, will you please answer the following?

(1) If the inlet pipes from the carbureter were lined with roller or ball bearings, would it facilitate the flow of gas either to the piston chamber or from certain correspondents?

(2) If, at 967 revolutions per minute, a man were seated on the connecting rod wristpin, how soon would he get a headache, and would its relative degree of thermal intensity, calculated in foot-pounds, be greater or less than the one under which the editor must be suffering?

(3) Does the expense of owning an automobile consist chiefly in repairs, guests, or fines? E. P. UNUM.

New York City.

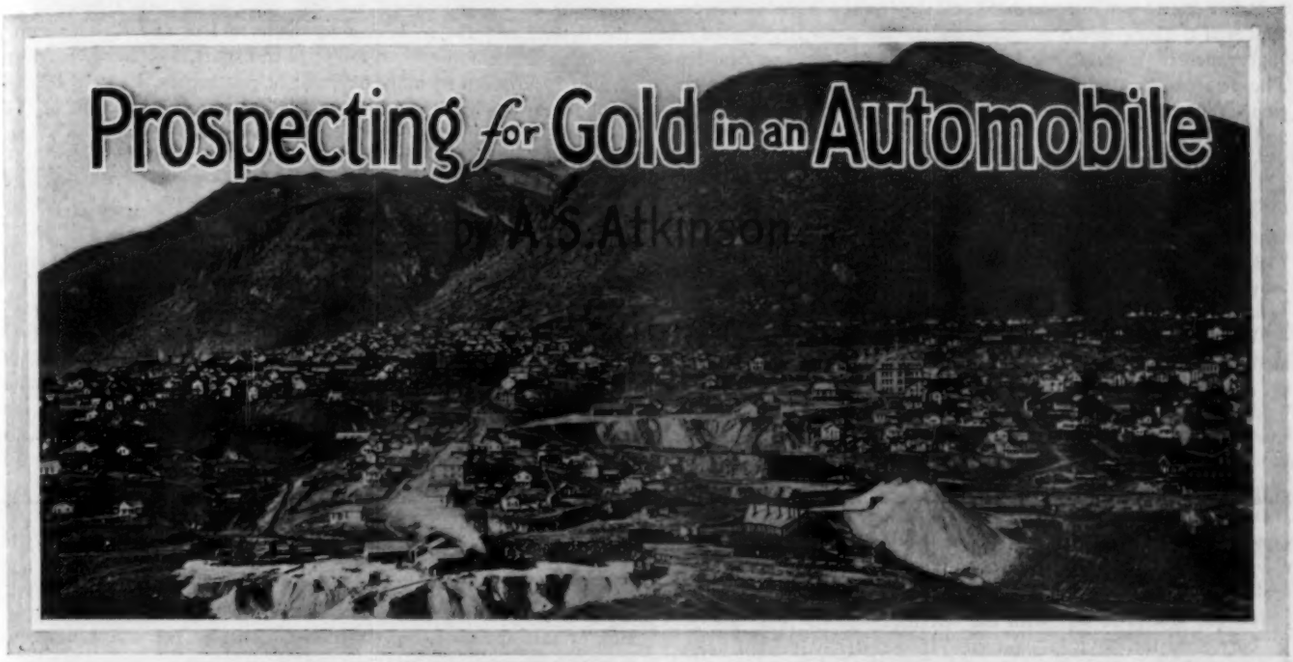
PLEASE GIVE US SOMETHING EASIER.

Editor THE AUTOMOBILE:

[656.]—The picture on page 436 in your issue of March 7 is certainly a "dandy." Will you please explain how a car could run through three or four inches of soft snow, as shown, and not leave a track? And oblige, A SOUTHERNER.

New Orleans, La.

Prospecting for Gold in an Automobile



TONOPAH, THE GOLD MINERS' EL DORADO OF THE NEVADA DESERT, AS IT LOOKS TO-DAY.

PROSPECTING for gold in an automobile is a common experience in Nevada, and the experience is interesting and instructive. The groups of Tonopah and Goldfield mines were originally about 200 miles from a railroad, but the trip on the back of a burro seemed like a thousand. Scores perished in the alkali dust of the desert, but a few persisted. They found gold, and, in spite of the hardships, thousands rushed to the new mining regions. Many of these would have perished had not the automobile come to their rescue. The automobile is the only vehicle which can travel across these alkali deserts without any apparent suffering. Horses and mules drop by the wayside and die like fleas, but the motor-driven vehicle skips along, immune both to dust and sun heat.

When we took our ride across the desert to the now famous mining camps regular auto passenger and freight service was in operation. We could make the trip in a luxurious car for $20—baggage extra. Everybody made the trip in autos. Even the miner with only a few weeks' funds ahead puts up the amount and travels in state. A good many have made small fortunes in operating autos on this desert trail. One man brought five touring cars here a year ago, and he has been renting them out almost daily at $100 per day. A chauffeur gets $10 a day and such perquisites as he can pick up.

Bag of Gold for Breaking the Record.

"Here's mine," explained a young, heavily-goggled driver to me, displaying a sack of gold. "Just took a fellow who struck it rich over to Tonopah and back. Said he'd make it worth my while to hurry. I took him at his word, and we beat the record. When he left me he dropped this in the car."

Judging from its weight, the gold might assay enough to buy a new car. Another young man from the East who came West in his car told me that he had picked up $10,000 in the past twelve months in carrying passengers and renting out his car. It is not uncommon to pick up crazy-minded gold fiends who will pay almost any price for a machine that will get them there.

When we struck Goldfield there was a subdued excitement in the air. There had been a new strike in the hills by a miner who a few days before had to mortgage his outfit to get food. When we arrived he was worth almost any sum within six figures. He was beset by gamblers, speculators, and miners who wanted to buy him out. Our first glimpse of him was when he rushed out of one of the saloons, wild-eyed and apparently cornered. Seeing our machine, he rushed toward it and said:

"Say, strangers, how much fur that thing?"

We informed him that we did not care to sell our car, but, not accepting this as final, he continued:

"I want it bad. I want to get out of here fur a breath of fresh air. God, I'm coated an inch thick with alkali dust, and I'll never get rid of it if I don't move out now. I've struck it rich, but I'm goin' to sell out. I won't work the claim."

Then, watching us closely, he said: "I'll give you $5,000 for that car."

We still demurred, and the man instantly raised his bid:

"Make it $7,000, and if you won't take that, I'll give you the limit—$10,000."

Here was a deal made by a gold-crazy, homesick man, but we compromised by offering to take him out of the desert for a nominal sum. We didn't care to sell our car at any price.

Alkali Dust Penetrates Everything.

If you never toured in the Nevada alkali desert you never can appreciate the conditions there. The alkali dust is everywhere. Goggles don't seem to keep it out of the eyes, and within a short time they smart as though pepper had been thrown in them. Then your throat gets dry, thirsty and hard. Breathing is rendered so difficult that an asthmatic is happy in comparison. You drink and drink, but the hard water of the desert simply makes matters worse. It is a veritable inferno for the first few days. Then nature apparently comes to the rescue. Your eyes get more used to the dust and begin to recover. Your throat gets coated with a good layer of dust, and it is then impervious to further trouble. During the season of hardening, however, the average man suffers torment.

Autoists are constantly arriving at the gold fields. Some are there out of curiosity, others are prospectors, newspaper correspondents, gentlemen, adventurers, engineers, mining students, and the driftwood from all parts of the country. The appearance of an automobile costing several thousand dollars is no indication of wealth, nor does a new one excite any comment. There are too many plying back and forth across the desert.

Gasoline at the Point of a Muzzle.

We stopped one day in the middle of the desert and made

preparations to eat our lunch. Suddenly to the right of the trail appeared a black speck, which grew in size until it assumed the appearance of a car flying heavily and asthmatically toward us. The two occupants of the car were trying to attract our attention. When they finally reached our side, the driver jumped down and said:

"Got any spare gasoline 'bout you?"

To our negative reply, he smiled sourly.

"Say, mister, we've got to have a few extra gallons. We've struck a 'lead,' an' we can't abandon it now. We've run short of fuel, and we haven't the time to go back to get more. If you'll let us have a few gallons, say just what you don't need to get you home, we'll pay well for it."

"We haven't much in the reserve tank," I began. Then I stopped and changed my mind. I was looking into the ugly muzzle of a weapon thrust at a dangerous angle toward me. The owner of it said quietly:

"You say, mister, it's worth about $5 a gallon? All right, me an' my pard will take it. Just fill our tank, and we'll call it an even $25."

Discretion was the better part of valor. There was no other human being in sight on the lonely trail, and that ugly-looking revolver did not waver. We meekly transferred all the reserve fuel we had on hand. The man chucked a roll of greasy bills in our car and rode off with the remark:

"Sorry, mister, to treat you so. If we strike it we'll set up for you, if we ever meet again."

Think of being held up in the desert in true stage-coach fashion for a few gallons of gasoline!

Did we meet our highwaymen again? Yes, a month later, in a gambling place in Goldfield, someone struck me on the back, and a familiar voice said:

"Glad to meet you again, mister. You did us a pretty good turn that day in the desert. We made the strike, and your gasoline did it. Now just ask for what you want. The establishment hasn't anything aboard that's too good for you. And if they haven't it here we'll send to Denver for it. Speak up."

Our requests were so modest that our erstwhile desert highwaymen appeared disappointed.

Desert Trail Leads Nowhere and Anywhere.

The trail over the desert leads to nowhere and anywhere. It is a winding trail marked out on a desert of alkali dust. In the Winter it is cold and barren, and in Summer so hot that the brain reels. The sun scorches everything, and the hot dust, filled with alkali and arsenic, fairly stifles one. After sundown there is some relief. The stars come out and blink like diamonds. The atmosphere is so clear that the heavens seem miles nearer. Not a cloud or speck of fleece for nights and weeks obscure the heavens. Autoing by starlight is, therefore, the ideal way to travel. After the long, hot day, the night is a relief. A tent of double thickness provided for protection from the hot sun is a godsend. Without it people crossing the desert wilt and shrivel up like leaves. It is a sight to see one of the regular automobile expresses heave in sight and discharge its passengers. There will be some old hardened miners and prospectors who do not appear to mind the terrible ride, but a few newcomers are among the lot. These look worse than seasick passengers on an ocean steamer. They are veritably encased in alkali dust so that it is difficult to move. They have lost all interest in life, and, if conscious, are generally silently cussing themselves for ever leaving civilization.

Before the Automobile Came on the Scene.

Before the automobile came to this region the mining prospector and investor had a hard time of it. The railroads are slow to build new extensions to their main lines to gratify the demands of a small mining camp. There have been too many of such "boom" towns, and the railroads want some assurance that a new settlement is going to be a permanent place of abode. Until this can be demonstrated the miners have to put up with such methods of travel as they can find. The horse is not adapted to the desert, and the mule can be made to live and do fair work under certain conditions. Freight is transported by heavy wagons drawn by a dozen or more burros, but passengers, infected by the gold fever, can never endure such slow traffic. The auto is the vehicle for them, and so there is a thriving business in these vehicles.

Unlike most mining camps, the new gold fields of Nevada are located at the foot of hills approached by perfectly level stretches of hard sand, across which the automobiles can fairly fly. Here are the greatest speeding stretches in the world. Hard, smooth, and level as a billiard table, and with almost endless vistas, the desert is a perfect place for speeding. It is a treeless and waterless region, but then there are no laws to regulate fast traffic. One can go as fast as his machine will permit, and no one will interfere. It is a scorcher's paradise, but, unfortunately, there is too much monotony in the landscape. Mile after mile is covered, and there is nothing to break the vista of sands. Occasionally one passes a prospector accompanied by two pack burros, or a caravan of heavily loaded wagons drawn by a dozen mules, or possibly some dejected miner who has given up hope and has dropped down by the trail to sleep and die.

The Fierce Ride Across the Burning Sands.

For anyone whose blood runs red, and who knows the exhilaration of fast speeding, the stretches of sand in Nevada must hold a certain amount of fascination. The tragedies of the gold mines, and the fearful heat of the sun and the tormenting pangs of alkali in eyes and throat, are forgotten in the fierce ride across the burning sands. The motor laughs at both heat and dust, and the rhythmic click and chug of the engine form a hymn of praise to man's genius in conquering nature in its worst forms.

There are all classes met in the gold fields, and particularly is this true of Nevada, where the name of Goldfield and Tonopah have served as magic drawing cards. One is surprised at the number of young men fresh from our mining colleges and other universities. They have come to the new regions to get their first hard experience in practical mining. But it is difficult to follow prosaic engineering in such an atmosphere. About half of them change their attitude when they have been here long. One college football player is now driving a passenger automobile, making more money than half those who delve in the sands for gold. Besides his $10 a day he picks up enough tips and extras to pay for his ordinary expenses. Another operates a stage line consisting of four automobiles between Tonopah and a neighboring mining camp. He is winning a fortune which later he may lose in the gamble for rich strikes. A third has been lucky in renting his machine to rich capitalists who appear on the scene almost daily and demand some means of pleasant transportation. One young man borrowed enough to purchase an automobile, and hied to the gold fields. Within two months he paid back the borrowed money, and to-day he owns in addition to his car two "claims," which may and may not prove valuable.

The autoist, passing through a new country, is always struck by the peculiar differences existing between the people there and from where he came. In the mining camps he can study human nature in the cosmopolitan form. They are all there, and the motor completes the final setting. If it were not for the alkali dust, the intense heat of the sun, and the parched, scorching torment of eyes and throat, it would not be difficult some day to imagine New York not a day's ride away, with all its wealth and fashion and its glitter of things that are not gold.

The annual meeting of the Austrian Automobile Club brought a re-election of Prince Alexander Solens to the presidency, with Major Wolf and Count Szecheny as vice-presidents. The new committee consists of Count Pallacicini and Schoenborn and Messieurs Bacher, Buschbeck, Hardy, Dr. von Mayr, Rucziczka, Eger, and Professor Goebel. The club has now a membership list of 891, and is financially in a flourishing condition.

TONOPAH-GOLDFIELD WINTER RUN.

Several months ago Jed Newkirk, an automobile driver of some prominence, came to New York City and selected a car for use in the Nevada gold fields. There comes from him the story of a recent winter trip of two S. & M. Simplex cars embracing several hundred miles of desert and swamp lands, borax beds, and the roadless country between Tonopah, Goldfield, and through Death Valley. The 30-mile run between Tonopah and Goldfield over a road which had had a three-day fall of snow, was covered in less than two hours.

After thawing out at Goldfield for an hour, the party started for Beatty, 71 miles distant. Just before passing through Baton they were obliged to ford a creek and to pass through some remarkably frozen country. At 8 o'clock that evening both cars arrived at Beatty, where the night was spent.

The next morning they started across Ash Meadow, which is 16 miles of swamp. It was not frozen, and, to make things worse, the rain poured in torrents, causing the wheels of the machine to sink in the ooze up to the hubs. After reaching Longstreets' Ranch, where the party partially "dried out," a start was made next morning for Greenwater. On the way it

JED NEWKIRK DRIVING S. & M. SIMPLEX ACROSS THE BEDS OF SALT AND BORAX.

was necessary to ford the Amagoshia river, which has an exceptionally strong current and is about 150 feet wide and three feet deep. In fording the water nearly drowned the motor, short-circuiting the magneto. The distance of 24 miles to Greenwater was covered in three hours.

That afternoon they were joined by a prospector who wanted to show them a claim he had marked out in Death Valley, in the Funeral Range Mountains. While this was only 14 miles distant, it was necessary to travel 90 miles over and around the mountains. There are absolutely no roads in this part of the world, owing to the numerous cloudbursts which make them impracticable. Upon arriving at Death Valley and passing "Scotty's" mine, the Amagoshia river had to be forded once more, and the destination was reached in a little over ten hours.

The party returned to Tonopah by a different route, necessitating the crossing of about six miles of borax beds and a rocky combination of salt and borax brutally rough and as hard as steel. Speaking of this stretch, Mr. Newkirk said: "It has never been crossed by a vehicle before, nothing but burros ever having attempted it. It is 200 feet below sea level and so intensely hot with vapor arising that the eye cannot see a mile in any direction."

The rest of the journey was made through the Furnace Creek Ranch of Smith, of "twenty-mule team borax" fame, over mountains 5,600 feet above sea level, through surfaceless roads that native miners claimed were unnegotiable, and ramming through snow-banks five to six feet deep. The party finally returned to Goldfield and from thence made their way back to Tonopah. Through the snow-drifts it was necessary to use one car as a snow plow with the second car following in its tracks, pushing the first; then both cars retreating and making a new attack to gain little more headway. This was done for ten hours at a stretch during part of the journey.

MADAME "BOB WALTER" IS DEAD.

France has not had the honor of producing many female automobilists. Indeed, women who drive autos are so much of a rarity that when one is seen it is safe to predict in nine cases out of ten that she is of American origin. Among the few members of the fair sex who have figured in the French automobile world is Mlle. Baptistine Dupré, better known as "Bob Walter," who has just died in Paris after a short illness. Madame Bob Walter is known to most Americans who have visited Paris by reason of her extensive garage in the Avenue de la Grande Armée, and the large business she did in renting touring machines. The firm had a reputation for the part it had played in the sensational runaway matches. A machine was ordered to be at a given address at a stated hour, it took on board a young couple, a few hours later a wedding ceremony was celebrated in Switzerland, Luxembourg, or Belgium, and the next morning the newspapers announced the elopement. Mme. Bob Walter displayed so much discretion in these affairs and was always so successful in her enterprises that she became an essential collaborator in all elopement cases.

The gay Toulousian first appeared before the Paris public as a theatrical artist, but left this profession a few years ago to enter the automobile business. In addition to her garage, renting business, the Napier, Vinot-Deguingand and an American motor boat agency, she played a prominent part in sporting events. At the Gaillon hill climb in 1902 she covered the kilometer in 1:30, one of her competitors being the famous Théry. The following year an automobile demonstration was given in the Bois de Boulogne in honor of the Shah of Persia. Madame Bob Walter was one of those who drove past the royal stand in a racing machine. Instead of rushing by at top speed, as the others had done, she stopped her machine opposite the Royal visitor, much to the annoyance of Baras, who was close in her rear, and who was more concerned over a kilometer record than paying homage to the King of Kings. The lady chauffeur combined with her business and sporting abilities a keen sense of humor and a happy repartee which stood her in good stead on her frequent appearances before the magistrates for exceeding the speed limit.

RACING MEN MUST HAVE SPECIAL LICENSE.

PARIS, March 12.—With the opening of the European racing and competition season, the new regulations of the Automobile Club of France, requiring every driver to have a license, come into operation. Owing to numerous complaints against drivers in touring, endurance and racing events, it was decided last year that no man should be allowed to compete in any event run by the A. C. F., or approved by that body, unless he possessed the competition license. As the club will only recognize those contests in which this condition is imposed, it practically follows that to compete in any race or contest on the Continent of Europe the driver must be licensed by the A. C. F. Obtaining the license is a very simple matter. The applicant should write to the Commission des Concours, at the A. C. F., Paris, stating his demand and enclosing a small photograph of himself mounted on cardboard. The license is pasted on the back of the photograph, and is granted to every applicant giving proof of his ability to handle an automobile. The A. C. F. reserves the right, however, to withdraw the license in the case of accidents caused by the driver, inobservance of racing rules or inattention to the orders of officials. This rule will, of course, apply to Americans taking part in any recognized race or competition in Europe.

TOO MANY RACES IN EUROPE THIS YEAR

THERE is interest and not a little profit to be had by a study of the automobile competitions to be held in Europe this year, for it is quite possible that similar conditions will be met with in this country in the near future. France in particular has made a specialty of organized competitions ever since the days when automobiles ran their faultering course on her broad highways. The policy was a wise one, for it not only encouraged manufacturers to renewed effort and developed better types of machines, but created an interest in the new industry among all classes of citizens. This year there will not be more competitions than usual, but there will be greater variety than ever before. Unfortunately it is not the variety which is the spice of life, but one already the cause of discord and some ill-feeling.

Excepting the Herkomer tour, all the European automobile competitions are speed tests. It is true that they are not all races in the sense of the Vanderbilt Cup or Grand Prix contests, but whether the contestants be 120-horsepower monsters, or small doctors' cars, fulfilling a very varied program, speed is the final standard by which they are all measured. All other schemes for measuring the value of a number of competing units have proved utterly unable to clearly indicate the winner or to present to the public a clear, unmistakable result. There have been innumerable competitions intended to test the all-round qualities of cars, and having for this purpose an elaborate point system. In nearly every case they produce half a dozen "winners" and, as in the case of *Le Matin* tour round France last summer, a prize for everybody.

The present difficulty is how to circumscribe the power of the machines so that the competitors shall start on an equal basis and the most rational type of machine be developed. The A. C. F. first broke away from the old weight limit which for a number of years had been the sole controlling factor in big speed contests in various lands, and substituted a limited fuel supply, as previously experimented by the English in the Tourist Trophy race.

Pleased with their move, the French Club announced a second race on the same basis, but with provision for cars of a moderate power. The limited fuel allowance Grand Prix obtained thirty-four entries—sufficient to give it the mark of success. The second race similar, but with a more limited fuel supply, obtained nine entries—sufficient to brand it a failure. Germany produced the Emperor's Cup race, with a limited cylinder bore, minimum weight and a few specified body dimensions; manufacturers showed their approval of the regulations by entering 92 cars, the biggest number obtained in a European race. Italy adopted a limited cylinder bore for its two big races, the Targa Florio and the Brescia circuit. Belgium has the old weight limit for its big race and a limited cylinder area for its Liedekerke Cup, with a provision that at least ten machines identical with the racers shall have been delivered to the public. The Marquis de Dion's foundling, known as the Press Cup, has a limited fuel supply as means of limiting the engine power, a minimum weight, a fifteen hundred miles eliminating tour and a three-hundred miles race as final test.

Discussion is raging fiercely on the various regulations, each one of which has its detractors and its enthusiastic supporters. The Grand Prix generally meets with approval, most manufacturers being of opinion that a fuel allowance of 6.6 gallons per 62.1 miles is preferable to the old 1,000 kilos weight limit. Its only opponents are those who are adverse to racing under any conditions. The second Grand Prix, or Sporting Commission Cup, a speed test on 3.3 gallons of gasoline per 62.1 miles, meets with criticism from every quarter. The opinion is widespread that a weight limit of 2,200 pounds should have been imposed to save the race from featherweight racers. With 6.6 gallons of gasoline an engine of 120 to 130 horsepower will be constructed which must weigh at least 2,200 pounds to stand the strain of a long, fast run. A minimum weight limit is therefore not necessary. With only 3.3 gallons a honeycomb racer weighing not more than 880 pounds, and driven by a high-compression motor of at least 60 horsepower, will be presented. Darracq alone is capable of producing such a light flyer, say the European constructors, and they leave the race severely alone. The German race generally meets with approval, as is shown by its big entry list. Certain critics, however, object that it will by its limited cylinder bore cause the development of engines running at an abnormally high rate. The Liedekerke Cup, the British Tourist Trophy, and the Press Cup of the A. C. F. are all approved in principle, but meet with criticism in their details. It is difficult to find two experts agreed as to the correct body weight and load for a given horsepower. A minimum weight keeps out light freaks, but it does not at all incite the body builder to produce comfortable, light coachwork. As everybody knows, it is weight that kills, and it is time the body builder cut down the enemy as the metal worker has done.

FROM PEKIN TO PARIS BY AUTOMOBILE

PARIS, March 11.—Nineteen cars have been entered for the adventurous auto tour from Pekin to Paris this summer. A few weeks ago *Le Matin*, a Parisian daily journal, made a violent attack on road racing in France and declared with such assurance that the Grand Prix would be annulled that the Automobile Club of France took fright and sought an interview with the Premier. Events proved that the semi-official *Matin* was wrong and a hearty laugh was directed against the journal. Undaunted, the paper attacked the touring contests, declaring that they were all worthless as a test of endurance. The Marquis de Dion took up the defense of the autoists and declared that a modern machine was capable of going anywhere. "Try a run from Paris to Pekin then," said the *Matin*. "Done," said the Marquis, and three De Dion cars were entered forthwith. Since then it has been decided to run the contest westward instead of eastward, and to open the competition to any car without restriction of horsepower, weight or nationality. On June 15 the competitors will be shipped by sea to Pekin, disembarking at Tien-Tsin. The caravan will pass over the Gobi desert, avoiding Moukden and Kharbine, with its anti-auto and anti-European natives. No one knows if there are any roads, but as Cormier, the European Gliddenite, says, the best thing to do is to go and find out. Gasoline stations will be in charge of the Asiatic Petrol Company, of Sumatra, on the Chinese portion of the route, and of Messrs. Nobel on the Russian section. The cars at present entered for the 8,750 miles' run are as follows: Itala, Prince Borghese; De Dion Bouton, three cars of 6, 10 and 15 horsepower; Contal, 8-horsepower voiturette and 6-horsepower tricar; Metallurgique, two machines of 30-horsepower, and one of 40-horsepower; Panhard, 18-horsepower, Baron Duquesne; Porthos (French); Werner tricar; Nistrat (French); Jean Bart (French); Valkyrie (French); Auto Office (French); Sider (French); Passe-Partout (French runabout); C. V. R. (British). There are no formalities, no entrance fees and no prizes. The competitors will be sufficiently rewarded by getting back to Paris, say the organizers. And, it may be added, by the banners and flags, colored placards, big drums and shrill trumpets which the *Matin* will not forget to bring out for its own and their benefit. Americans are invited to enter and show their ability on bum roads and no roads.

SPRING ACTIVITIES IN AUTO CLUB CIRCLES

Annual Dinner of the Wachusett A. C. of Massachusetts.

BOSTON, March 18.—The annual dinner of the Wachusett Automobile Club, held last Wednesday night at the Parker House, brought together not only a substantial number of the club's members, but leading automobilists from the various clubs throughout the State and two national officers of the A. A. A. President W. H. Chase made a versatile toastmaster and the list of speakers included Elliot C. Lee, president of the Massachusetts State Automobile Association; Lewis R. Speare, president of the Bay State Automobile Association and first vice-president of the A. A. A.; F. E. Peabody, president Massachusetts Automobile Club; J. P. Coghlin, president Worcester Automobile Club; G. W. Hills, president Brockton Automobile Club; A. E. Bliss, president Malden Automobile Club; Dr. V. H. Irwin, president Automobile Club of Springfield; Frederick H. Elliott, secretary A. A. A., and A. G. Batchelder, member of the A. A. A. executive committee. Others who spoke included ex-President Putnam of the Wachusett Club, Senator Blodgett and ex-Representative Patton. The Wachusett Club is in flourishing condition, its principal membership being drawn from Fitchburg and Leominster, but the annual function is usually held in Boston at the time of the show in that city.

Philadelphia to Have Monster Orphans' Day.

PHILADELPHIA, March 18.—The advent of springlike weather has brought the local club promoters out of their winter lethargy, and plans are already afoot for a monster Orphans' Day outing, which, with the Philadelphia, Quaker City, and Germantown clubs all co-operating, promises to be one of the largest affairs of the kind ever held in the East. It is proposed to interest the local traction company officials to the extent of having them throw open the many amusements at Willow Grove Park to the little ones, free. If Willow Grove cannot be secured, some one of the other pleasure resorts near the city will be selected. It is expected that upwards of 200 cars can be secured for the run, which would insure a glorious day's outing for at least 1,000 parentless boys and girls.

The Automobile Club of Philadelphia at its meeting last week elected Alfred N. Chandler, Isaac Starr, George B. Linnard, and S. Boyer Davis to the Board of Governors.

Chicago Motor Club Will Hold Three Track Meets.

CHICAGO, ILL., March 18.—Three track meets, to be held on Memorial Day, Fourth of July, and Labor Day, respectively, will be held under the auspices of the Chicago Motor Club this season. This was decided upon at the meeting of the club last week, and Chairman J. W. Hayden of the Racing Committee has applied to the National Racing Board for the dates and official sanction. President F. C. Donald appointed a committee consisting of N. H. Van Sicklen, Secretary George G. Greenburg, F. W. Cornish, O. F. Weber and J. W. Hayden to confer with the Contest Committee of the Chicago Automobile Trade Association for the purpose of mapping out a summer's campaign of reliability runs, hill climbs, etc. N. H. Van Sicklen will represent the club on the A. A. A. Touring Board.

Automobile Club Organized at Stamford, Conn.

STAMFORD, CONN., March 19.—With a charter membership of ten the Stamford Automobile Club has been organized with the following officers: President, Dr. F. Schoir; vice-presidents, Dr. Rice, J. K. Lawrence; secretary, Dr. Dean Foster; treasurer, Dr. J. Howard Smith. Applications to the number of fifty for active membership will be acted upon at the next meeting.

President White, A. C. Buffalo, Appoints Committees.

BUFFALO, N. Y., March 18.—At the recent meeting of the board of directors of the Automobile Club of Buffalo, President Seymour P. White, Vice-President Frank B. Hower, and Secretary Dai H. Lewis were appointed as the three directors from the club to the New York State Automobile Association for the ensuing year. They will attend the meeting of this week in Auburn. President White has appointed the following standing club committees for the present year:

Membership—D. H. Lewis, chairman; J. A. Cramer, E. C. Bull, E. R. Thomas, Charles F. Benzing, N. C. Wilcox, C. B. Penney. Law and Ordinances—H. A. Meldrum, chairman; Louis B. Hart, William H. Hotchkiss, E. H. Butler, W. J. Conners, D. H. Lewis, W. H. Andrews. Grievance—F. B. Hower, chairman; J. W. Gibbs, W. H. Baker, C. A. Criqui, John M. Satterfield, Dr. G. H. McMichael, H. A. Bull. Entertainment—J. B. Eccleston, chairman; Dr. John S. McFarland, D. H. Lewis, S. P. White, W. S. Longnecker, James How, M. E. Taber. Executive—Seymour P. White, D. H. Lewis, John M. Satterfield. Roads—John M. Satterfield, chairman; E. R. Thomas, W. Allen Gardner, George K. Birge, Norman E. Mack, James D. Warren, Ralph Plumb.

Activities of the New York Motor Club.

NEW YORK, March 18.—It is among the probabilities that in the near future the New York Motor Club will have an entire house somewhere in the automobile district. An active campaign of recruiting is to be started at once and a membership close to the thousand mark is expected before the end of the summer. Monthly entertainments will be held.

There was a large attendance at the really excellent smoker given last Friday night at "Reisenweber's," the talent including prominent vaudeville performers. I. W. Fickling, the newly appointed chairman of the entertainment committee, began his tenure of office with gratifying results. Unfortunately the presence at the Boston show of many leading tradesmen interfered with the six vs. four-cylinder argument, which will take place early in April. Guests at the smoker included President Schultz of the Richmond County Automobile Club, who made a felicitous speech; Vice-President Paine, another Staten Islander, and H. A. Bonnell, secretary of the New Jersey Automobile and Motor Club. The next event will be early in April.

Texan Autoists Are Energetic In and About Houston.

HOUSTON, TEX., March 18.—The recent annual meeting of the Houston Automobile Club declared in favor of holding an automobile show in this city next year. In connection with the proposed show, the plan is to hold competitions and valuable prizes will be offered to attract manufacturers and others interested. A special legislative committee, consisting of Thomas J. Anderson, David Daly, Dr. Lossing, John J. Foley and C. L. Bering, was appointed to look after the interests of automobilists in the proposed auto law now before the Texas legislature.

The following officers were elected for the ensuing year: President, Harvey Wilson; vice-president, C. H. Dunbar; secretary, Samuel Bering; treasurer, G. W. Thiel; first captain, John Patrick; second captain, John J. Foley.

Quaker City Club May Have to Select Another Hill.

PHILADELPHIA, March 18.—Although the Quaker City Motor Club has not yet filed with the Park Commissioner a request for a permit to run its Memorial Day hill climb over the City Line road, the notices to that effect published in the papers

aroused a storm of opposition, and "kicks" were registered by horse drivers who would be going to the Belmont Park race track on that day; by Grand Army posts, who would be detailed to decorate graves in West Laurel Hill Cemetery, and from the officials of the cemetery companies, who said the closing of the road would interfere with interments. Besides, it develops that Montgomery county, which, halfway up the hill, borders the road on the north to and beyond the finish, would have to be consulted. From this showing it is almost positive that a permit for the use of City Line road will not be made, and that a less frequented course—posibly Chestnut Hill or Wissahickon Heights road—will be selected by the Quakers.

Ohio Automobile Association to Meet March 30.

CLEVELAND, O., March 18.—Saturday, March 30, the annual meeting of the Ohio State Automobile Association will be held in this city at the clubhouse of the Cleveland Automobile Club. The State organization, which was formed about a year ago at Columbus, comprises four clubs, representing the foremost cities in the State, Cleveland, Columbus, Cincinnati and Akron. At the coming meeting it is practically assured that the Springfield Automobile Club will join the association. There will be a larger number of representatives at the meeting than were present a year ago, for all the clubs have grown considerably and the clubs' delegation is computed by its membership. One delegate is allowed for every hundred members or fraction thereof, while an additional representative is permitted for every increase of fifty members.

As the township trustees are to meet on the same day in Cleveland, the association has invited them to attend the meeting to discuss the question of good roads.

New Jersey Endurance Run Entries Close May 22.

NEWARK, N. J., March 18.—Date for the closing of entries for the endurance contest of the New Jersey Automobile and Motor Club has been set for May 22. This eight days before the date set for the start of the run—May 30-June 1. The special committee in charge of the run has been preparing drafts of the rules governing the contest. A number of details are still unsettled at the present writing, but everything is expected to be whipped into shape at the next meeting of the committee. Present indications point to a very large list of entries for the run.

A. C. of Maryland Elects Its Directors.

BALTIMORE, March 17.—At a well attended meeting of the Automobile Club of Maryland, held in their clubrooms at 12 West Mt. Royal avenue, this Board of Directors for the year were elected: F. W. Darling, C. Warren Stork, M. S. Hess, O. I. Yellott, H. M. Rowe, R. G. Dulany, and J. S. Reese.

Before the election, the club was presented, through W. S. Belding, a pair of andirons from C. S. Detrick. The design showed an auto climbing Washington Monument. As a proof that an auto can do such things, the miniature car is firmly fastened near the top of the monument.

Autoists and Horsemen Combine to Organize Montclair Club.

MONTCLAIR, N. J., March 18.—At the new Hotel Montclair, approaching completion on the top of the Orange mountains, near Bloomfield avenue, there will be launched on May 1, at the opening of the hotel, a riding, driving and automobile club, which will take its place of prominence among the exclusive organizations of the town. At first it was intended to organize only a riding and driving club, but the unusually large number of automobilists in Montclair altered the plans of the organizers. The new club promises to have a charter membership of fully 200 of the most substantial people of Montclair.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

March 21-30....—New Haven, Conn., Second Regiment Armory, Automobile Show, under the auspices of the local dealers.
April 1-6.....—St. Louis, Mo., Automobile Show, Jai Alai Building, St. Louis Automobile Dealers' Association.
April 6-13.....—Montreal, Canada, Second International Automobile and Sportsman's Exhibition. R. M. Jaffray, manager, 309 W. Notre Dame street.
April 8-13.....—Pittsburg, Pa., First Annual Show of the Pittsburg Automobile Dealers' Association, Duquesne Garden.

Races, Hill-Climbs, etc.

April 1.....—St. Louis, Mo., Auto Floral Parade, Automobile Club of St. Louis.
May 6-7.....—Harrisburg, Pa., Two-day Endurance Run, Motor Club of Harrisburg.
May 30.....—Philadelphia, Hill Climb, Quaker City Motor Club.
Oct. 19.....—St. Louis, Mo., International Aerial Race for the Gordon Bennett Prize. Aero Club of America.

Motor Boat Races.

June 8.....—670-Mile Ocean Motor Boat Race, New York to Bermuda. Motor Boat Club of America and Royal Bermuda Yacht Club.
July 20.....—New York to Marblehead, Mass., 270-mile Motor Boat Race. New Rochelle Yacht Club.
Sept. 2-6.....—Jamestown (Va.) Exposition, Motor Boat Races.

FOREIGN.

Shows.

Mar. 24-April 1.—Prague, Austria, Automobile Show.
April 6-13.....—London, Agricultural Hall Motor Show.
May 4-15.....—Madrid, Spain, Automobile Exhibition, Palace of Fine Arts, Royal Automobile Club of Madrid.
May 15-26.....—Zurich, Third Annual Swiss Automobile Show.
June 25-30.....—St. Petersburg, Russia, Automobile Show.

Race Meets, Hill Climbs, etc.

March 20-27....—Nice (France) Automobile Week.
April 1-16.....—Spring Wheel Competition, A. C. of France.
April 21.....—Targa Florio Tour (Sicily), Auto Club of Milan.
April 25-28.....—Touring Contest, Automobile Club of Touraine.
April 28.....—Chateau Thierry Hill Climb.
May 18-21.....—Milan, Italy, Touring Club Trials.
May 24-27.....—Voiturette Contest, Automobile Club of Austria.
May 28.....—Isle of Man, Tourist Trophy Race, Automobile Club of Great Britain and Ireland.
May 30.....—Isle of Man, Heavy Touring Car Race, Automobile Club of Great Britain and Ireland.
May 29-June 1..—Irish Automobile Club Reliability Trials.
June 3-12.....—Paris, Electric Vehicle Competition, Automobile Club of France.
June 3-12.....—Herkomer Cup, Automobile Club of Bavaria.
June 14.....—German Emperor's Cup, Taunus Circuit, Imperial Automobile Club.
June 20-22.....—American Gold Cup, Start from New York of European Tour for American Cars, Georges Dupuy, secretary, 1402 Broadway, New York City.
June 14-29.....—Scottish Reliability Trial, Scottish Automobile Club.
July 2.....—Grand Prix, Automobile Club of France.
July 14, 1908....—Paris to London, Aerial Race.
July 15-18.....—Ostend Week, Record Trials, Automobile Club of Belgium.
July 21.....—Ardennes Circuit (Belgium).
July 31.....—Liedekerke Cup for Touring Cars, Ardennes Circuit, Belgium.
July 31-Aug. 8.—Belgium Regularity Contest for Touring Cars. A. C. of Belgium.
August 1-7.....—Criterium of France, 1,750 Miles Touring Competition and 250-mile race for the Press Cup. A. C. of France.
August 11-20...—France, Coupe de Auvergne.
Sept. 1.....—Italy, Brescia Circuit, Florio Cup. A. C. of Italy.

Motor Boat Races.

April 2-15.....—Monaco Motor Boat Exhibition and Races.
June 15-28.....—Kiel (Germany) Motor Boat Races.

CLEVELAND TO CHICAGO TO NEW YORK

IT is practically decided that the annual A. A. A. tour for the Glidden and other trophies will start from Cleveland, go west to Detroit and Chicago, and return eastward through Pennsylvania and New Jersey to New York City. A day or two less than a fortnight will be occupied and the event will take place either in June or July. The exact details will not be given out for at least another week.

Though the National Association of Automobile Manufacturers, through its Executive Committee, first came out as not being particularly in favor of any open touring event, the expression of a contrary opinion by a substantial number of prominent members brought about the appointment of a special committee consisting of Windsor T. White, Benjamin Briscoe and George W. Bennett. This trio on Monday, in New York City, met Chairman F. B. Hower, P. S. Flinn and Secretary D. H. Lewis of the Executive Committee of the A. A. A. Touring Board, when the situation was thoroughly canvassed, the conferees agreeing in the main on the general outline of a long-distance tour.

It is understood that while the rules will not be of the most exacting sort, the daily mileage will be of such length to thoroughly test the endurance qualities of cars. There will not be the frequent replacing of parts without penalization, as was the case last year, and it will be more of an effort to secure a clean score than was the case in the 1906 event. The route will embrace large cities and resorts where hotel accommodations are sufficient to provide for the autoing cavalcade. It is expected that the entry list will be nearly double that of the previous contest. A separate class for runabouts may be decided upon, with a special cup for the winner.

ADDITIONS TO THE A. A. A. RACING BOARD.

Chairman Jefferson DeMont Thompson, of the A. A. A. Racing Board, recommended an increase of his board to President W. H. Hotchkiss, who approved of the following additions:

E. H. R. Green, Dallas, Texas; Asa Paine, Daytona, Fla.; Frederick R. Pratt, Newark, N. J.; A. B. Lambert, St. Louis, Mo.; W. S. Belding, Baltimore, Md.; Charles J. Swain, Philadelphia, Pa.; Philip S. Flinn, Pittsburg, Pa.; Ira M. Cobe, S. J. Martin, Jr., Chicago, Ill.; H. L. Bowden, H. W. Knights, Boston, Mass.; Albert Mackie, New Orleans, La.; W. E. Edge, Atlantic City, N. J.; L. A. Wood, St. Paul, Minn.; E. J. Wiedecken, Milwaukee, Wis.; F. L. Bartlett, Denver, Col.

The previous members of the board in addition to the chairman were W. K. Vanderbilt, Jr., E. Russell Thomas, A. R. Pardington, Frank G. Webb, A. G. Batchelder, S. M. Butler, New York City; R. L. Lippitt, Providence, R. I.; George L. Weiss, Cleveland, O.; and Frederick H. Elliott, secretary.

The technical advisors to the board are E. R. Thomas, Buffalo, N. Y.; Henry Ford, Detroit, Mich.; A. L. Riker, Bridgeport, Conn., and J. J. Mann, Paris.

Following the policy of the other A. A. A. boards, the Racing Board will elect an executive committee, particularly for the purpose of supervising the Vanderbilt Cup race next Fall.

FUTURE MEETINGS OF A. A. A. DIRECTORS.

The March meeting of the Board of Directors of the American Automobile Association will be held at the A. C. A. clubhouse, West Fifty-fourth street, New York City, Wednesday, March 27, at 2:30 P.M.

On the morning of the same day at 10:30 o'clock there will be a meeting of the Legislative Board, presided over by Chairman Charles T. Terry, the Manhattan Hotel being the place.

The annual meeting of the New York State Automobile Association is being held to-day at Auburn. Oliver A. Quayle will probably be re-elected to the presidency, there being a general desire for his continuance in the office.

DENVER'S SHOW, APRIL 11, 12 AND 13.

DENVER, COL., March 18.—Dates for the Denver automobile show have just been announced as April 11, 12 and 13. The exhibition, as usual, will be held at Coliseum Hall, which will be attractively decorated for the occasion. The dealers are already enthusiastic over the outlook for a most successful show and practically every make of car having agents in the Rocky Mountain region will be represented at the show.

The garage of the Automobile Club of America was partially opened to members early this week. It is expected that the entire clubhouse on West Fifty-fourth street will be completed early next month.

THE LAST BREATH OF WINTER—THOMAS FLYER, THOMAS FORTY AND THOMAS RUNABOUT IN CENTRAL PARK, NEW YORK CITY.

THE AUTOMOBILE

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Some Popular Ignition Fallacies Shattered.

Just who was responsible for the selection of that most incongruous of terms—the word "fat," to designate the size of an electric spark, will probably always remain a mystery. It is one of those oddities that spring up and become a part of the vernacular of a trade or profession overnight, as it were, and while its aptness from the popular point of view is undisputed, its technical signification is something that yet remains to be satisfactorily elucidated, and probably always will continue in this state. Electrical discharges through air are either in the shape of jagged lines, or are spherical, depending upon the length of the gap and other factors. The former simulates lightning on a diminutive scale, while the latter gives the impression of being more hot and fiery. Its unusual shape doubtless called forth its curious appellation, while the impression mentioned was responsible for the belief that it was the most effective for ignition purposes. If a "fat" spark could be produced at the plug, there was nothing further to be desired in the shape of greater efficiency. Such a spark was believed to be productive of greater power than any other variety.

This is a popular fallacy that has existed ever since the inception of the automobile, and in earlier days it was not confined to the user alone by any means. The coil that could bridge the longest gap or produce the largest arc was considered the best for ignition purposes, as it was thought necessary to have such a spark to fire the charge in the cylinder. To the coil makers is due much of the credit for designing apparatus that relieved the autoist of considerable of the burden of excessive battery maintenance, and recent investigations have demonstrated how well founded is the contention that a minimum amount of current is equally effective for ignition purposes, as an amperage that proves destructive of contact points. The experiments of W. Watson, D.Sc., F.R.S., whose paper on the subject, read before the Automobile Club of Great Britain and Ireland, is reproduced elsewhere in this issue, are particularly enlightening. He showed conclusively that the length of the spark gap had no influence whatever on the power, while high efficiency was possible with a minimum consumption of current. Modern coils are designed to give satisfactory service on .25 to .75 ampere, but it is Mr. Watson's belief that with properly designed apparatus .1 ampere would be sufficient, which is somewhat of an improvement over the "fat" spark that takes two to four amperes of current.

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Standardization Coming as a Natural Sequence.

While the matter of standardization is one that comes in for a spasmodic burst of enthusiastic attention from time to time, usually ending with a suggestion that the parts of all automobiles should immediately be made to conform to a certain standard, the fact that the process is one that is constantly working toward that end without the assistance of any organized effort appears to be overlooked. So far as small parts are concerned, it is extremely desirable, not alone that a certain standard be adopted and adhered to, but that it be one which makes for simplicity to the greatest possible extent. There are entirely too many small nuts and bolts about the average automobile, and, moreover, they are far too diverse in their form and size. The step already taken in this direction is one that will doubtless be productive of good results.

On the other hand, the very thing that the opponents of any general system of standardization most fear seems to be gradually coming about unaided—that close approach to conventional design of both motor and car which it is thought will discount originality and be productive of thousands of cars alike in every respect as so many bricks. There has never been a time in the past when the layman could say with more truth that all automobiles looked alike to him, as is the case at present, yet the premium on originality that is based on sound engineering and economic ideas is as high as ever. What is more, though all cars should reach a point where even the initiated find it difficult to identify them offhand, there is no fear that the time will ever come when it will be possible to pick a car blindfolded, confident of selecting the best of its kind. Given identically the same materials, the same designs and the same class of skilled workmen, the different factories will turn out cars of differing merit, so that it is a waste of time to predict the advent of a day when all cars will actually be alike, regardless of the extent to which standardization be carried, whether deliberately or unconsciously.

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Automobiling Now Has Many Organizations.

If an opinion may be based upon the events of the past few months, it is safe to say that within the near future there will be no one, whether manufacturer, dealer, or owner, who cannot lay claim to identification with some body, having as its aim co-operation and the mutual benefit of those directly engaged in its particular branch of effort in the automobile industry. In a pursuit which, though destined to be one of the greatest, had to fight for its existence from the start, the first followers early became aware of the necessity for co-operation, so that automobile builders were represented by an organization almost before they could lay claim to have reached the stage of being an industry. Subsequent events have shown the wisdom of the step, and the unanimity with which the example has been followed by every group having a distinctive interest attests strongly to the benefits to be derived from co-operative effort. The spirit manifested in this universal idea of "getting together" that has been so prominent of late is commendable and should result in the lasting good of all concerned, regardless of the particular branch with which they are affiliated.

MAYOR WHO WANTS MORE SPEED IN PARKS.

PHILADELPHIA, March 18.—The recent meeting of the Fairmount Park Commission considered not a little legislation of interest to automobilists during its two hours' session. First, Mayor Weaver surprised his fellows by filing a vigorous protest against the present maximum speed limit allowed vehicles using the park roads. His honor thought it should be fifteen instead of seven miles an hour. Colonel Snowden thought the present limit is just right—and breaks the law every time he drives his spanking team of bays in the park. The Colonel, who was well aware of the Mayor's bias automobileward, avowed that there are many automobilists who are suffering from what he called the "speed craze." "They are very reckless," he said, "and go spinning along as though everybody else were dirt of the earth."

"Well," responded his honor, "I would like to be able to drive through the park without fear of being arrested. Fifteen miles is a perfectly safe limit—for automobiles, at least. The seven-mile limit is violated every day, and the guards sometimes arrest those who exceed it; in the majority of cases they don't. If we only knew when they were feeling charitable we would be safe. But it's dangerous to take a chance with a guard who is liable to enforce the law to the last jot and tittle when his dinner fails to agree with him."

MORGAN AS A GOOD ROADS ADVOCATE.

JACKSONVILLE, FLA., March 18.—W. J. Morgan, well known because of his promotion of the Ormond-Daytona meets and Mount Washington climbs, is a student of good roads building, and while here the other day was interviewed by a *Times-Union* reporter. In the course of the interview he said:

"Every well wisher and believer in the undoubted great future of Florida is fully alive to the tremendous importance that can be attached to the outcome of the endeavor to have the prison labor of the State used for road building and the fate of the bills that will be produced at Tallahassee next April.

"As one who has labored in the interest of the movement North and South, I believe now, as I believed eleven years ago, when I interviewed the governors of the South on the proposition, that prison labor cannot be utilized with better results than it can in providing much needed good roads for every State in the Union."

CONVENTION OF THE AMERICAN ROADMAKERS.

PITTSBURG, PA., March 16.—Automobilists were in evidence at the fourth annual convention of the American Roadmakers' Association, held in this city during the past week. A. R. Pardington, of the Long Island Motor Parkway, one of the most interesting speakers, was listened to with marked attention. Over a thousand highway commissioners, engineers, and road constructors from various States all over the country, attended the meetings.

One result of the convention was a promise by Highways Commissioner Hunter, of Pennsylvania, to assist by every means in his power the building of the much-sought Philadelphia-Pittsburg highway.

Chairman Robert P. Hooper, of the A. A. A. Good Roads Board, and Augustus Post, a member of the same board, were among those present.

MARYLAND HORSEMAN SUCCUMBS TO AUTO.

BALTIMORE, MD., March 17.—General Alfred E. Booth, for many years one of the most prominent horsemen in Maryland, has sold his entire stable to make way for the automobile. The last team sold was the blue ribbon pair at the Eldridge show last spring and the same two took the honors at the Atlantic City show. General Booth will build in the rear of his residence on Eutaw street one of the most spacious and elaborate garages outside of New York City.

WHAT THE NEW INDIANA LAW REQUIRES.

INDIANAPOLIS, IND., March 19.—Contrary to expectations, the automobile law passed two years ago was changed by the Indiana Legislature which adjourned last week. Those who were closely acquainted with the legislators know that the new law is nothing more nor less than a compromise with the rural constituency of some of the members pledged to make the law more stringent.

The principal change is that of the size of registration numbers, which must now be five inches high, of a half-inch stroke and white on a black background. In approaching dangerous points automobiles must be under control, and must not run at a greater speed than six miles an hour in passing farm houses or animals. Another new feature is that numbers must be carried on both front and rear.

The only other change in the old law is that in the penalties for violation, which formerly was a fine not exceeding $50 for each offense. The new law provides a fine not exceeding $50 for the first offense, $100 or less for second offense and $200 or less for the third and following offenses.

DELAWARE TO GIVE TEN-DAY PRIVILEGE.

WILMINGTON, DEL., March 18.—The new automobile law is now before Governor Lea for signature. Twelve miles an hour is allowed in cities or towns in which the houses are less than 100 feet apart. Twenty miles is the speed limit in the open country. The registration fee for owners of machines is $3 and for chauffeurs $2. Non-residents are allowed to use their machines ten days during the year in Delaware without registration, providing they are registered in their home State.

COLUMBUS, O., TO COLLECT MAIL BY AUTOS.

COLUMBUS, O., March 17.—Permission has been granted Postmaster H. W. Krumm by the postal authorities at Washington to make use of automobiles for collecting mails. The new service will begin July 1. Under the arrangement contemplated, the Government will furnish the machines, and if after a trial the plan proves satisfactory, a full service of autos will be installed for the collection of mail from all the boxes and sub-stations.

FIFTEEN MILES IN ILLINOIS OPEN COUNTRY.

SPRINGFIELD, ILL., March 18.—The automobile bill which has the support of the Illinois State Automobile Association has been passed in the Senate by a vote of 31 to 3. Six miles an hour is called for in business and residence districts and fifteen miles an hour in the open country. Racing on a public highway is prohibited by a $50 fine.

KULICK TO DRIVE THE FORD CUP CAR.

Henry Ford was a New York visitor this week, and brought news to the effect that his Vanderbilt Cup racer is nearly ready for assembling. It will be driven by Kulick, well known as a Ford pilot in the past. The racer will be of six-cylinder construction and as light as possible.

STILL MORE VANDERBILT CUP ASPIRANTS.

The B. L. M. firm announces that it will construct three racers for competition in the eliminating race for the Vanderbilt Cup contest. Had particulars of the French Grand Prix been sent to this country earlier, the B. L. M. people declare that they would have entered a team of three.

LICENSED SHOW EARLY IN NOVEMBER.

Providing a rearrangement of dates can be effected by the Madison Square Garden Company—which fact is practically assured—it is among the probabilities that the A. L. A. M. show will take place during the first week in November.

THE GRAND PRIX DETAILS.

PARIS, March 12.—Although an official announcement has not been made regarding the manner in which the Grand Prix racers will be started, it is practically certain from the opinions expressed at the meeting of the Sporting Commission yesterday that the Grand Prix racers will be started first, commencing at 6 o'clock and following at one-minute intervals. The Commission Sportive racers will be started at 9 o'clock with four-minute intervals. By this ararngement the first machine to finish the race will be one competing for the Grand Prix. The wood track opposite the grand stand, particulars of which have been given, will be constructed and will be used to start the small racers. It is now practically certain that the wood banked turn proposed near Dieppe will not be built. The members of the Sporting Commission are of opinion that a special banked turn capable of being taken at high speed is not desirable. Knowing that the turn is made for speeding, the drivers will take every risk and will be sure to meet with accidents; whereas, if the turn is left in its natural condition, prudence will be observed. This was proved in last year's Grand Prix, the banked turn near Le Mans being productive of several minor accidents, while the sharp unprepared turns were all taken in safety.

In addition to the tire and gasoline station at the grand stands, there will be an auxiliary tire station at some point about half the distance from the starting point. This station will be confined strictly to tires.

Deliquescent Salts to Prevent Dust.

M. G. Le Roy, professor of chemistry at Rouen, has brought before the Sporting Commission the value of deliquescent salts (chloride of calcium or chloride of magnesium) as a means of rendering the course dustless. Last year the Sarthe circuit cost $11,000 to tar, and was not satisfactory; as the Dieppe course could be rendered dustless by the use of deliquescent salts for the sum of $1,000 there is every probability of this process being adopted.

A sum of $2,000 has been voted by the Commission départementale for the improvement of the road between Dieppe and Londinieres. This stretch, bordered by the local railroad, is at present the weakest point of the course, but so much attention is being given to it that on the day of the race it will be as fast and as safe as any other portion of the circuit. One of the valuable features of the Dieppe district is that the local authorities are all willing to aid in putting the roads in racing condition at their own cost.

King Edward May Attend the Grand Prix.

Rumor declares that a well-known sportsman, a personal friend of the King of England, is endeavoring to obtain the presence of Edward VII at the Grand Prix. No response has yet been given to the invitation, but as details have been studied the belief is expressed that an acceptance will be given. His Majesty would come on his private yacht, sleep on board in Dieppe harbor, travel to the course by automobile, and leave immediately the race was over.

Albert Clement on a 50-horsepower Bayard-Clement, George Heath on a powerful Panhard, Garcet on a Bayard-Clement racer, and Degrais on a Germain have all spent some time on the course during the past week. They all declare themselves satisfied, and predict a high average speed.

Fiat and Itala have officially declared that they will not enter for the Grand Prix. Entries at double fees will be received until April 15 for both the Grand Prix and the Sporting Commission Cup, but it is not expected that any firm will take advantage of the delay.

Mr. Stead, the American racing man of Paris-Madrid fame, has introduced motor taximeters into Monaco in the shape of three-quarter landaulets well upholstered, with electric lighting. The charges are three francs for the first and one franc for each additional kilometer

THAT "INVASION" OF AMERICANS.

After throwing mud at each other for a few days, the editors of the two most important Parisian daily automobile journals appear to have arrived at a common understanding regarding the danger likely to arise from the "invasion" of the American automobiles engaged in the Gold Cup tour. *L'Auto,* the semi-official organ of the Automobile Club of France, now declares that if the tour assumed dangerous proportions it would be obliged to do all in its power to defend the national industry. Judging from some of the remarks, the national industry is a frail creature unfitted for the hard knocks of this wicked world.

The Marquis de Dion, head of the great De Dion-Bouton factory, one of the largest and oldest automobile factories in France, declares in his official capacity of President of the Chambre Syndicale de l'Automobile that it is impossible that a competition should be allowed on the soil of the *patrie* to be organized by foreigners and be reserved entirely for foreign cars. The Marquis fails to tell whether the loss of his American trade has influenced him. One firm, and one only, announces that the X & X machines are not afraid of the American invasion, and that they will match themselves against any competitors.

The French automobile public appears to be unaware of the fact that the invaders consist largely of those peaceful tourists whom they usually receive so heartily and feed so liberally. True, one frivolous Parisian suggested that the Yankee money-bags should be received with all the old world courtesy which was not lost during the Revolution, encouraged to distribute their dollars, to purchase jewelry, works of art, dresses, and everything else that France will barter for money; then, when their American machines are broken down—of course they will all break down—that they should be visited by smooth-tongued selling agents with real automobiles to sell. The hotel proprietor, who only knows that the Yankee brings a big pocket-book with him, thinks this good advice, and would follow it whatever the Parisian thunderers said.

But automobile France has a wider vision and sees in the peaceful travelers the forerunners of that invading host which some day might sweep away the dear national industry.

Georges Dupuy, who is carrying the burden of the work in arranging the Gold Cup tour of the American cars through Europe in July and August, reports nineteen entries up to date, with assurances that at least thirty cars will be obtained for the 4,000-mile journey through eight European countries. Mr. Dupuy is congratulating himself upon the excellent advance advertising which the tour is receiving in France. He is confident that before the cavalcade reaches French soil the makers of that country will realize how futile and uncalled for is any spirit of antagonism which seems to have been aroused through a lack of understanding of the real intent of the tour—that of giving Americans an opportunity of participating in a non-strenuous competition and at the same time seeing Europe in the most advantageous manner.

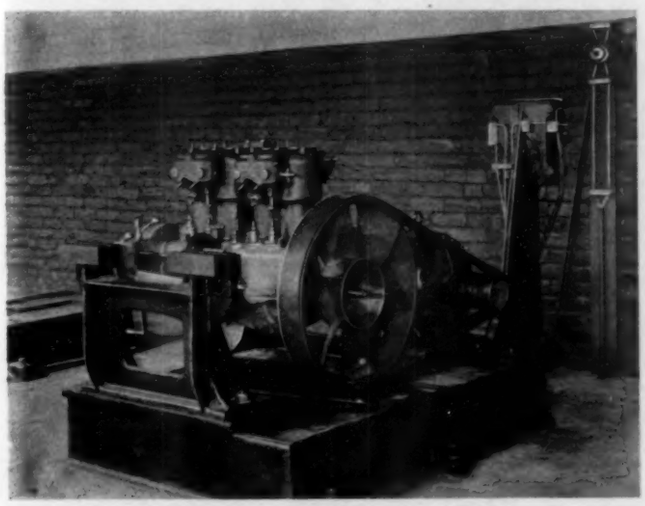
At a recent meeting of the Commission of Competitions of the A. C. F., called upon to give an opinion concerning the caravan of American automobilists, the Commission expressed itself of the opinion that, "not being international, this test is not a competition, and the results would have none of the guarantees which exist in every competition in which members of automobile clubs have the right to take part."

GERMAN AUTO CLUB IS FLOURISHING.

The annual meeting of the Imperial Automobile Club of Germany proved that the club has prospered exceedingly, and has now a very formidable members' list, consisting of 7 life, 1,106 ordinary, 334 extraordinary, and 34 lady members. The whole of the retiring executive board was re-elected and Count Arco and Dr. Veit newly appointed to the same, which is now made up of the Duke of Ratibor, Prince Hohenlohe, Baron Brandenstein, Count Sierstorpff and Herr Goldberger.

RADICAL DEPARTURE IN AUTO MOTOR TESTING

THERE has been installed in the motor testing department of the American Locomotive Automobile Company, at Providence, R. I., makers of the Berliet car, an innovation consisting of a hydraulic brake, which absorbs and accurately measures the brake horsepower developed by the motors. After assembling, the motor is placed on a "jigging" stand and driven by a variable speed electric motor, for the purpose of polishing the bearings,



CLOSE VIEW OF MOTOR ON TESTING BED.

pistons and other wearing parts, and reducing their friction to a point where it is safe to run the motor under its own power. The variable speed electric motor lends itself admirably to this purpose, as it permits beginning the operation at a very low speed and gradually increasing to a speed approximating that of the motor when run under normal conditions. During this period all wearing parts are flooded with oil, and closely watched to guard against excessive and injurious heating.

After the satisfactory termination of this operation the motor is transferred to the test stand proper to be run under its own power. The test stand consists of a heavy cast iron bed plate, supporting the hydraulic brake at one end, and with suitable brackets adaptable to the different size motors at the other. Flexible connections are used for water, gasoline and exhaust pipes to facilitate coupling up and dismounting the motor.

At first the motor is run with no load, and any adjustments necessary in the carbureter or ignition apparatus are made. After being well limbered up, a load is then applied by the brake.

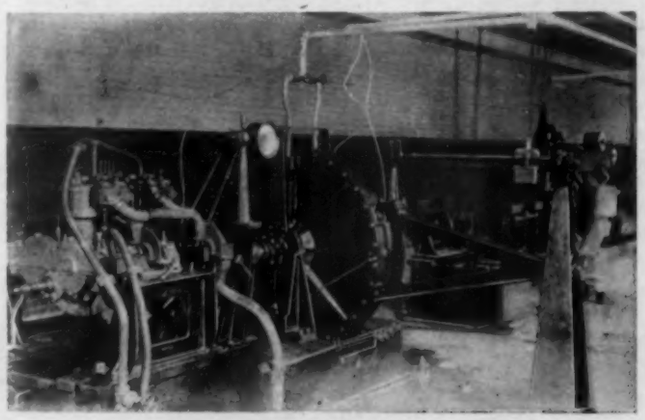
Details of the Hydraulic Brake.

This consists of a casing, or stator, provided at each side with trunnions, supported by segment struts, which in turn rest upon knife edges. The rotor consists of four steel discs 40" in diameter and ¼" thick, securely keyed to a substantial shaft driven from the motor by a universal jointed shaft and multiple disc clutch. The brake discs revolve in four separate compartments within the casing, but clear the walls in all directions by 3-8", the only metallic contact between the rotor and stator being in the bearings which carry the shaft. The casing is free to revolve through a very small fraction of a degree, its movement being absolutely without friction because of the manner in which it is supported. From the periphery of the casing an arm projects, the end of which is linked to a steel beam supported on knife edges by a pillar in the same manner as the beams of platform scales, the whole forming a compound lever, corrected for balance by an adjustable weight. The scale beam is graduated to read pounds, and, by means of a vernier, one-tenth pounds, a sliding weight being moved along the beam by means of a screw and hand wheel, so arranged as not to disturb the balance. The leverage of the beam is so calculated that at 1,000 R.P.M., one pound represents one horsepower, and proportionately, more or less, according to the speed. One-tenth pound read on the vernier, therefore, represents one-tenth horsepower at 1,000 R.P.M., and is proportionate at varying speeds. The pounds pull thus registered is proportionate to the torque of the motor, and by dividing this figure by a constant, the torque at one foot radius can be readily determined.

How Readings Are Taken.

When it is desired to take a brake reading, the spring-actuated multiple-disc clutch is permitted to engage gradually, the brake discs then being driven by the motor. Water is admitted to one of the end compartments near the shaft, and its flow regulated by an ordinary globe valve. Centrifugal force carries the water out to the periphery of the disc, creating an enormous pressure, the water serving as a friction medium between the steel disc and walls of the compartment, the result being a tendency of the casing to rotate with the discs in direct proportion to the friction, and hence to the torque. Whatever friction results from the rotation of the shaft in the bearings of the brake casing, has a tendency to revolve it in the same direction; therefore, the entire power developed by the motor is accounted for by the weighing apparatus, which counteracts the tendency of the casing to rotate. It will be seen from this that no losses occur in the transmission of power from the motor to the brake, and readings are accurate to within a small fraction of 1 per cent.

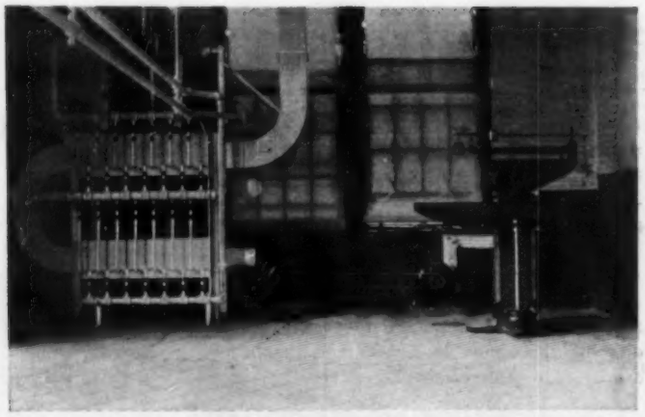
If one disc or compartment is not capable of absorbing the total power of the motor, the compartment at the other end of the casing can be brought into service, and the water in these compartments may be transferred to the inner compartments by means of by-pass valves, thus bringing all four discs into use and absorbing the maximum power of which the brake is capable. By varying the quantity of water in the compartments a very flexible control is obtained. This is done by regulation of the



COMPLETE APPARATUS READY TO OPERATE.

inlet and outlet, or drain valves. The mechanical energy of the motor is converted into heat inside the brake, and is carried off by the water, the temperature of which is usually kept below 150 degrees F. The larger motors developing greater horsepower, and, in proportion, a greater amount of heat, require that a greater volume of water pass through the brake in a given time.

As the only available water supply at the American Locomotive Automobile Company's plant is from the city mains, means are



VIEW OF THE SECTIONAL RADIATOR AND BLOWER.

provided for cooling the brake water, as well as the jacket water from the motor cylinders, and using it over and over again. It is returned by pumps through a series of radiators, cooled by air from an electrically driven fan, to storage tanks, from which it runs by gravity again to the motors and brakes. The radiator tubes are arranged in parallel and controlled by a series of valves, in a such a way that any number of sections can be made inoperative, thus providing a means for maintaining a constant temperature of water supplied to the brakes and cylinder jackets, regardless of varying atmospheric conditions.

Advantages of the Hydraulic Brake.

Aside from its flexibility, one of the chief merits of the hydraulic brake is its constancy, and therefore its readings may be relied upon with absolute certainty. A tachometer belted from a pulley on the motor cam shaft gives the speed of the motor at all times, and during the test readings are taken at regular intervals of the pounds pull and speed indicated, and a record of the performance of each motor kept. These records are filed away for reference and may be seen by purchasers. The conditions to which motors are subjected when on test are as nearly as possible analogous to those met with in actual service, which are desirable from many points of view.

A spacious room is specially equipped to facilitate the work of motor testing. A traveling crane lifts the motors from the shop trucks to the stands and vice versa, and transfers them from one part of the room to another. The exhaust is led into an underground pipe, with an outlet at some distance from the building. The gasoline tank is buried at some distance from the building, and gasoline is supplied to the test room in the safest manner. A small sheet iron house erected over the main supply tank contains a small tank holding about three gallons, and placed somewhat higher than the carbureters of the motors being tested, connection being through underground pipes. Gasoline is supplied to the small tank by a centrifugal pump at the bottom of the main tank, driven by an electric motor, controlled from the test room.

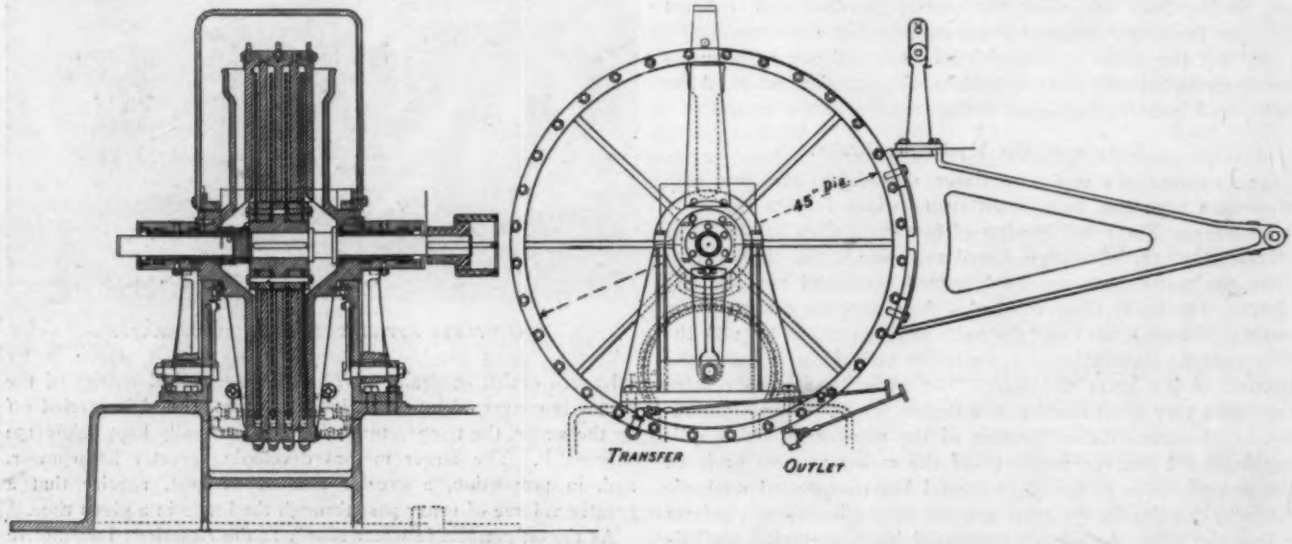
In case of fire the fuse in the motor circuit would burn out, only permitting the fuel in the small tank to flow into the room, should the carbureter connections be severed.

HARTFORD COMPANY MAKES MANY CHANGES.

In addition to the resignation of Secretary Gilson, as recorded last week, many other changes in the personnel of the officers of the Hartford Rubber Works Company resulted from the last meeting of the board of directors. Thomas Midgley resigned as president to devote himself entirely to the interests of the Midgley Manufacturing Company, of Columbus, O., of which he is the head. His successor is J. D. Anderson, who only resigned the vice-presidency of the Hartford company several months ago to accept the presidency of the G & J Tire Company, Indianapolis. V. B. Lang, who succeeded him at the time, has been re-elected vice-president and also appointed general manager, while H. Plow was elected treasurer, and E. R. Benson, formerly manager of the company's Boston branch, was elected secretary.

WHO INVENTED THE MOTOR SCOOTER?

A new invention is never produced without its originality being contested. Nathaniel Roe presented a motor scooter a few weeks ago which seemed to have solid claims to originality. It appears now that Roe was not the first to travel over the ice in a motor-driven boat. During the winter of 1904-5 Chas. G. Ketcham, of Eastport, L. I., fitted an ordinary scow with a two-cycle, 3-horsepower gasoline motor, connected direct by a belt to a large spiked wheel mounted forward of the motor and adapted to engage the ice through a slot in the floor of the boat. The motor scow was steered with a sharpened steel rudder blade on the end of a longsweep. Ketcham's craft seems to have embodied the same ideas as were presented recently by Roe, but in a rough and unfinished manner.



CROSS SECTION AND LONGITUDINAL ELEVATION OF THE AMERICAN LOCOMOTIVE COMPANY'S MOTOR TESTING PLANT.

H. I. CASHMAN ASSISTING FLOODED FOLK IN ALLEGHENY, PA., WITH HIS WHITE STEAMER. STREETS NEAR RIVERS WERE OVERFLOWED.

AUTOS AGAIN PROVE INVALUABLE.

If there were ever any motorphobes in the downtown district of the city of Allegheny, Pa., they probably revised their ideas after the great flood of last week. Never were means of swift and sure transportation more needed than when the rivers commenced to overflow their banks and to inundate a part of the residential district. Although warnings there had been in plenty that a flood was imminent, it was not until the water commenced to course through the streets that people thought of abandoning their homes and seeking shelter on higher ground. Then they found that the means of escape at hand were hopelessly insufficient. Those who had obtained possession of rowboats were charging $5 a head to carry people to places of safety. Empty boxes, planks and all kinds of household furniture were pressed into service as rafts. In many instances these frail craft were swept out into the river, with the result that over twenty lives were lost in this way in the vicinity of Pittsburg alone.

The flood of the three rivers reached the height of 36.2 feet, more than a foot higher than ever recorded before. Automobiles were about the only vehicles to be seen in dozens of submerged streets, and they performed their service so well that it has been suggested that the Pittsburg police department keep an exact record of the location of every big garage in the city, so that in flood times they might call on the managers for autos in extreme cases. These owners and managers, by the way, showed a measure of public spirit last week that has never been equaled in Greater Pittsburg. In their own way, and unaided, they organized an automobile service that gave direct and timely aid to hundreds of business men and women.

H. I. Cashman, with a White steamer, was one of the earliest arrivals on the scene in Allegheny, having crossed the bridge merely out of curiosity. Finding need of his services, he immediately went to work, and from along the water front carried many loads of people to places of safety. The Banker Brothers had a car carrying twelve persons running back and forth, and excellent service was provided by the Winton and Darracq branches, and the Colonial and others were equally helpful.

THAT BOSTON TO NEW YORK MOTORWAY.

Boston, March 19.—Many prominent automobilists attended to-day's hearing before the Roads and Bridges Committee of the Legislature in reference to the proposed motorway from New York to Boston. The estimated cost is $70,000 per mile, total length 172 miles, and cost of construction about $15,000,000.

RECENT RAMBLER NON-STOP RUN.

Van Evra B. Martin's 2,000 miles non-stop run on a Rambler machine was privately undertaken to prove that a stock machine was capable of a 1,000-mile trip without stopping the motor and without any particular preparation. The road conditions were the worst possible for such a trip. The engine was cranked by Sherburne M. Becker, mayor of Milwaukee, and the car was driven by Mr. Martin himself. The total time between the starting of the motor and the handing over of the engineers for a thorough examination of the parts was 168 1-2 hours, of which time the car had been on the road approximately 153 hours. Total mileage covered was 2,281, and the total distance covered up to the time of stopping the motor was 2,002 1-2 miles. The running time of the motor was 140 hours and 36 minutes.

For the two thousand miles run 137 1-2 gallons of gasoline were consumed, thus the mileage was 14 1-2 miles per gallon. The oil consumption was 19 1-2 quarts. Figuring the gasoline at 18 cents per gallon, the present retail price in Milwaukee, and the lubricating oil at 50 cents, the fuel cost aggregated $24.75.

Hartford-Dunlop tires, with Midgley treads, were used and held up particularly well in view of the road conditions.

On the completion of the trip the car was entirely dismantled and publicly examined by Vigil Oldberg, M.E., of the Armour Institute of Technology, and Edward B. Waite, head of the instruction department of the American School of Correspondence. It was found that the entire replacement of parts showing wear would cost, including time, but $7.50.

HOW THE ROADS WERE ON RAMBLER NON-STOP RUN.

GUSTAVE CHEDRU JOINS THOMAS COMPANY.

A valuable addition has been made to the engineering department of the E. R. Thomas Company, of Buffalo, by the appointment of Gustave Chedru as its head designer. Some intimation of the personnel of this corps was given when it became known that Gustave Caillois, late of the Brasier factory, was at the head of the Thomas racing team on the Vanderbilt cup course. The other members of the department were not, however, made known. Prior to joining the Thomas interests M. Chedru was technical manager and consulting engineer with the Société des Automobiles Théry. He began his designing career eighteen years ago with the Continental Edison Company, later becoming designer for the Compagnie Electrique Théry. During his fourteen years connection with gasoline engines he has been designer for the De Dion-Bouton firm, chief engineer with the Richard-Brasier factory, and superintendent with the Bayard-Clément company. Mr. Chedru is the designer of the Brasier racing machines which won the Gordon Bennett Cup two years.

GUSTAVE CHEDRU.

HARRISON WAGON COMPANY REORGANIZED.

GRAND RAPIDS, MICH., March 18.—The Harrison Wagon Company, manufacturer of automobiles, and the Harrison Land Company, have been reorganized with the following acting as directors in both companies: J. R. Wylie, C. H. Hollister, Mark Norris, Maurice Shanahan, and H. W. Marsh. These directors elected the following officers for the wagon company: James R. Wylie, president; Clay H. Hollister, vice-president; Mark Norris, secretary and treasurer. This action was taken to give the entire control of the Harrison properties to the creditors. The automobile department of the factory will be continued.

RUNNING DAY AND NIGHT FOR TWO YEARS.

CHICAGO, ILL., March 18.—W. Hildreth, manager of the Holsman Automobile Company, states that recently 15 cars were shipped in a single day and 35 cars was the total for the week. The factory has been in operation day and night for the past two years, and there appears to be no signs of a let-up, in view of the many orders that await delivery.

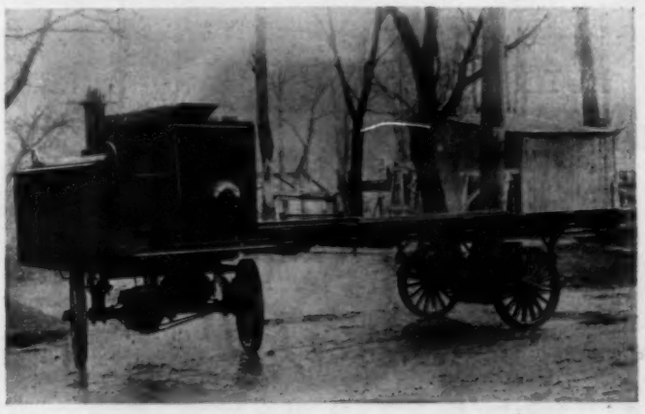
"BOB" ALEXANDER TESTING POPE-HARTFORD.

In all kinds of weather Pope-Hartford cars are given severe trials in the neighborhood of the factory. "Road King" Alexander is doing Newington mountain near Hartford, Conn.

DETROITER PRODUCES A NOVEL COMBINATION

DETROIT, MICH., March 18.—Rodolphus Fuller, a resident engineer of this city, has just completed the first one of a new type of motor trucks designed particularly for heavy haulage. As will be plain at a glance from the picture of the new machine, it departs from the conventional vehicle of this class in a number of respects. It is a combination gasoline-electric wagon upon which Mr. Fuller has received patents. The power plant consists of a four-cylinder, 40-horsepower gasoline engine, direct-connected to a multipolar direct-current generator of the standard type, and is located in a sort of housing the top of which does duty as the driver's seat.

The actual driving equipment consists of two electric motors, one of each of which is carried on the front and rear axles in connection with a differential. The controller is somewhat similar to the type used on street cars and gives the different speeds by varying the amount of current passing through the field windings of the generator, any speed up to a maximum of six miles an hour being available either forward or reverse. The control may be further varied by applying the power to either the front or rear motor separately or to both simultaneously. A turntable type of front truck is used in preference to the usual knuckle style of guiding the vehicle in order to obtain a sharper turn, a turning radius of little more than its own length being claimed for this vehicle. Ball bearings are used to reduce friction on the turntable, while an indicating pointer shows the driver exactly the direction the front wheels are heading at any time. The machine runs on steel-tired wheels, and to refute the criticism that has arisen on this point, it is said that the inventor has demonstrated that the tires have sufficient traction by running the car through deep mud. The carrying capacity of the truck is seven tons, and its weight 3,850 pounds, or just 55 per cent of its effective load, allowing an unusually high efficiency. A company is being organized to manufacture the new trucks, which will be placed on the market at $5,000.



NEW GASOLINE-ELECTRIC TRUCK FOR HEAVY WORK.

LONG ISLAND MOTOR TRADE ASSOCIATION.

Following a preliminary meeting of a number of prominent agents and dealers in Brooklyn a fortnight ago with a view to co-operation, a meeting was held at the Imperial on the evening of March 14, and as a result the Long Island Motor Trade Association was organized. E. H. Barnum, Ormond Auto Company, was elected president; L. H. Allen, I. S. Remsen Mfg. Co., vice-president; B. D. Underhill, Brooklyn Motor Car Supply Company, treasurer, and D. D. Martin, New York Broadway Tire Company, secretary. Fifty dealers were present, and numerous others wrote signifying their intention of joining the association, something of a surprise being occasioned by the election of the Standard Oil Company to membership.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The Mitchell Auto Company has been organized to handle the Glide line of cars in St. Joseph, Mo., and vicinity, and will keep a full line of Glide machines of the different models in stock.

The placing of vanadium steel on a commercial basis enables American automobile makers to produce machines that are unsurpassed in any particular by cars made in Europe, declares Henry Ford.

The National Electrical Supply Co., of Washington, D. C., wholesale and retail dealers in automobile tires and accessories, has been authorized by the state corporation commission of Virginia to increase its capital stock from $100,000 to $200,000.

The Alamo Engine Works, of Hillsdale, Mich., is engaged in erecting an additional machine shop, 127 x 40 feet. The building will form a unit of the group plan which the factory will require for its business. The company's business is rapidly increasing.

Capitalists are at present interested in a proposition from C. H. Brooks, of Detroit, for the establishment of an automobile factory at Port Huron, Mich. The new factory would manufacture the "Brooks" car, a new machine which will be placed upon the market this year.

Having decided to purchase automobiles for the use of its inspectors, the Bureau of Highways of New York City decided upon the Model E four-cylinder Mitchell as the most satisfactory car for their requirements. The purchase was made through the Mitchell Motor Company, of New York, at 1787 Broadway.

Charles Clifton, treasurer of the George N. Pierce Company, of Buffalo, believes the six-cylinder car to be the best thing for high power cars. His view is that the six-cylinder engine has proved its superiority to the satisfaction of engineers, and that users will adopt this type as fast as they become acquainted with its real merits.

After running the round of all the big shows the Lozier 40-horsepower motor inclosed and operated in a glass case, is about to be shipped to the Lozier headquarters at Fifty-fifth street and Broadway. This motor has sections cut from the cylinders, valve chambers, etc., enabling the observer to see the inner working and operation of the engine.

D. L. McDonald, a Texas real estate agent, finds his Winton invaluable in making land sales. "If it were not for this car," he says, "I simply could not do business, for our land is so far away from railroads and trolleys, and I have yet to find a team of horses that could handle a load of seven passengers at the speed and over the grass-grown country that the car can easily negotiate."

Owing to a typographical error in the Warner Instrument Company advertisement in the March 7 issue of THE AUTOMOBILE, what was really a very creditable showing for that well-known instrument in the Glidden tour was made to appear of only passing interest. The original copy read that thirty eight instead of eight of the sixty-two Glidden tourists had their cars equipped with Warner Auto-Meters.

One of the most important orders received by the Hartford Suspension Company came last week from the Olds Motor Works, which sent in a preliminary order for 100 sets of Truffault-Hartford shock absorbers to be used as equipment on their high-speed gentleman's roadster. This adds another big manufacturer to the sixteen already in line who consider the shock absorber a necessary addition to their cars.

One of the most uniquely finished automobiles turned out has just been delivered by the E. R. Thomas Motor Company, of Buffalo, to O. P. Letchworth of that city. The car is a silver plated Thomas Flyer, all of the exposed brass parts on the car having been coated with silver, giving it a rather dazzling appearance. The use of silver by Mr. Letchworth is not a fad, but has been adopted by him owing to the fact that he believes it can be kept clean much easier than brass.

Some misapprehension has arisen regarding a notice made in THE AUTOMOBILE of March 7, dealing with the occupancy by the Buick Company of a portion of the Winton branch at Chicago. Some time ago the Buick Company leased for two months a section of the second floor of the Winton premises, this section being separated by a brick wall. As a matter of fact the Winton Company uses the entire first, second and third floors and basement of the Winton branch at Chicago.

The first 1908 American Mercedes built in the new factory of the Daimler Manufacturing Company, of Long Island City, has been sold to the Garden City Company, of Garden City, L. I. This will be the first 1908 German Mercedes model, as the American Mercedes is made from the latest blue prints furnished from the parent factory in Germany. The Garden City Company is practically the Stewart estate, and the new garage this corporation intends constructing on its land this spring will be one of the finest in America.

Mrs. William K. Vanderbilt, Jr., has recently purchased one of the new White Steamers. This car will be the third successive model of this make which she has owned. Mrs. Vanderbilt is at present in Europe and the order for the car was given to the White garage in New York by her sister, Mrs. Herman Oelrichs. Mrs. Vanderbilt has always shown a marked preference for the White, and this is the only make which she essays to drive herself. She is frequently seen scurrying along the Long Island highways.

The plant of the Tweedale Foundry and Machine shop, at Constantine, Mich., has been taken over by the Constantine Manufacturing Company, organized by Charles Cohn, Constantine; C. E. Fousel, Centerville; Luther Sevison, Port Huron, and D. L. Chipman, Peoria, Ill. The new company will manufacture the Sevison sparker for gas engines. It is attached to the flywheel and is said to be able to furnish the necessary spark for an indefinite time. Plans are also under consideration by the company for the manufacture of several other electric articles.

An employment bureau has been opened by the American Motor Car Manufacturers' Association which it is expected will prove advantageous to its members. Good men are hard to get and it is felt that a central bureau where applications could be received either for men or for positions would work out well. This move is the result of numerous applications having been received for sales managers, factory superintendents, salesmen and demonstrators. All applications for positions are placed in the employment department, and are held confidential. They should be addressed to Alfred Reeves, general manager, 29 West Forty-second street, New York.

An excellent method of educating owners of Maxwell automobiles on the construction and care of their machines is being adopted by the Maxwell company. A textbook has been compiled consisting of a series of eight lectures arranged in sequence. The first lecture deals with everything in the most elementary manner and makes the subject clear to even the most ignorant. Later lectures deal with the technical features of the automobile, the text being made clear by numerous diagrams. The last lecture discusses many points of value on the cost of upkeep of a Maxwell car. The book has been prepared under the care of A. A. Grant, author of "The Making of an Automobilist."

An enthusiastic autoist who has his Columbia car provided with three styles of bodies, writes: "Before purchasing my car I had little idea of the wide variety of service that can be obtained by going to the expense of extra bodies. During the early spring I fit the car with a touring body which seats the whole family. In the summer, when most of the family is at the shore, I substitute a runabout type. My son and I drive to work every morning, a distance of ten miles. On Saturdays we drive to the shore, fifty miles away, and remain there over Sunday, when other members of the family make use of the car. In the early fall a touring body is again fitted to the chassis and is provided with a cape top having side and front curtains, affording ample protection from the elements. In the winter a limousine body is fitted which is especially desirable for the trip to and from the office and for the ladies of the family for shopping and calling. Thus my car is made to serve the purposes of a good stable of horses. I have found the investment a good one."

NEW AGENCIES ESTABLISHED.

John T. Fisher has opened an agency in Chicago for the Mercedes Import Company, at 319 Michigan avenue.

The Southern Automobile Company of Asheville, N. C., has taken the agency for the Rambler for Western North Carolina.

The Motor Car Company of Washington, D. C., agents for the Peerless, Thomas, and Stevens-Duryea, has also secured the Buick agency.

In the issue of THE AUTOMOBILE, March 14, it was stated that the firm of Banker Brothers of Pittsburg had taken up the agency for the Aerocar. This was an error. Banker Brothers are agents for the Autocar.

The F. B. Stearns Company, Cleveland, O., makers of the Stearns, has placed agencies with the following houses recently: Wilson Automobile Company, 118 St. Lawrence avenue, Wichita, Kans.; N. E. Peterson, 1520 Belmont avenue, Seattle, Wash.

The Reliance Motor Car Co. has made agency connections with the Fiss, Doerr &

Carroll Horse Company of New York, a corporation handling more horses than any other firm in the world. It is significant that they should show their progressiveness by being one of the first to take up the motor truck.

The Supplementary Spiral Spring Company, 4524-4526 Delmar avenue, St. Louis, Mo., has opened a branch in New York City at 52 West Sixty-seventh street, and Allen McKenzie has been placed in charge. Mr. McKenzie is well equipped to interest the Eastern trade in the springs made by his company and expects to develop the already large demand for them in metropolitan automobile circles.

Joseph L. Keir, the agent for Michelin tires and Renault machines in Philadelphia, has just opened at 1437 Vine street one of the most complete tire repair works in the country. The factory, which is operated by steam and electricity, is equipped in the most complete manner. The foreman has come from the factory of the Michelin Tire Company in France and will introduce the repair methods so successful in that country.

For the convenience of the trade in Pittsburg and vicinity the Diamond Rubber Company has established a general agency for its tire and accessories at No. 16 Wood street, that city. This new tire establishment occupies a part of the quarters of the Pittsburg Rubber and Leather Company, which concern has for many years been the agents for Diamond mechanical rubber goods in that territory. A complete stock of tires of all types and sizes will be carried.

RECENT TRADE REMOVALS.

This week the Philadelphia agency for the Knox moved into its newly fitted quarters, 510-512 North Broad street.

The Henshaw Motor Car Company, Boston agents for the Haynes and Columbus electrics, has moved into its new store at Massachusetts avenue and Newbury streets, that city.

McDonald, Titus & Co., central Ohio agents for Reo and Mora autos, have leased the four-story building, 61-63 Spring street, Columbus, and will occupy it in its entirety, removing from 138-140 Spring street, where they have been located for several years.

PERSONAL TRADE MENTION.

Freeman L. Loomis has been appointed sales manager of the Reliance Motor Car Company. Mr. Loomis was for twenty years the most active field organizer of the Aultman & Taylor Machinery Company at Mansfield, O.

A. J. M. Edwards, who has been connected with the Electric Vehicle Company since 1899, has been placed in charge of the New York branch, succeeding W. W. Burke, who was recently elected president of the Motor Parts Company.

W. T. Helfer, for many years manager of the Boston branch of the Diamond Rubber Company, and well known throughout the New England States, has joined the Springfield Metal Body Company's selling forces as sales manager, with offices at Springfield, Mass.

"Mike" Costa, a power in Philadelphia cycling trade circles in the last century, has embarked in the automobile business. He has formed the M. J. Costa Motor Car Company at 2117-2121 North Broad street, where he will handle the Bayard-Clement machine in Philadelphia and neighborhood.

R. C. Wright, for the past two years general foreman of the machine and model departments of the E. R. Thomas Motor Company of Buffalo, has accepted the position of general superintendent of the Auto Car Equipment Company of Buffalo, manufacturers of gasoline and electric trucks and sightseeing vehicles.

Thomas S. Witherbee, formerly president of the Witherbee Igniter Company, has engaged in a new business enterprise. He has organized the Witherbee Manufacturing Company, with factory and offices at 433 West Forty-second street, New York City, and will make a new storage battery and several other ignition specialties.

The Dolson Automobile Company of Charlotte, Mich., has made arrangements with F. G. Bremer to take the position as assistant general superintendent of its factory. Mr. Bremer comes from the American Mercedes Company of New York, and previous to his association with that company he was with the Pope-Toledo Company of Toledo, O.

President Percy Neel of the Quaker City Automobile Company of Philadelphia has secured the services of Charles P. Soules, the well-known racing man, to look after the interests of the Pope-Toledo car in that city. In view of the rather comprehensive program of races, hill climbs, endurance runs, etc., outlined by Philadelphia club enthusiasts for the coming season, it is expected that with Soules to guide them the Pope-Toledos will be heard from with considerable frequency.

RECENT TRADE PUBLICATIONS.

Westbrook generators are dealt with in the little folder issued by E. T. Kimball Company of Boston, Mass.

The Stackpole Battery Company of St. Marys, Pa., has issued a folder dealing with their various types of dry cells for automobile and telephone work.

"The Power Behind" has the quality of originality. It deals with the power behind the Wayne automobile, but the way the manner is presented in the little booklet is rather out of the common.

York Pullman automobiles are entertainingly dealt with in the catalogue issued by the York Motor Car Company of York, Pa. The different models are described in detail and illustrated by numerous half-tone cuts.

"Expert Testimony on Springs" is the title of the booklet published by the Perfection Spring Company, 251 Superior viaduct, Cleveland, O. Copies of letters from expert users of the firm's springs are given.

The Gilbert Manufacturing Company of New Haven, Conn., has issued a folder dealing with their Gilbert helmet and the Gilbert Poncho, desirable articles for use in stormy weather, and have also sent out an advance catalogue of their complete lines for 1907.

The Supplementary Spiral Spring Company issued recently a sixteen-page booklet with cover in two colors, which illustrates graphically five different methods of attachment of supplementary springs to cars of different models. The booklet also contains considerable other information, as well as many testimonials to desirable features of this equipment.

"The American Truck" is the title of a pleasing catalogue issued by the American Motor Truck Company of Lockport, N. J. It has been gotten up in the best style known to the typographical expert and very graphically shows the engine, mechanical parts, complete chassis and fully equipped vehicles for various loads and different classes of business constructed by the American Motor Truck Company.

Owing to the large size and the many articles illustrated, the publication of the 1907 catalogue of Automobile Supplies by the New York Sporting Goods Company, 17 Warren street, New York, is a little later this year than usual. They announce, however, that their "big book" is now ready and everyone is invited to write for a copy. This company has for years made a specialty of the bicycle trade and are probably the largest handlers of these goods in the east. They control many valuable agencies, including the Pittsfield Spark Coil Company's goods and Hudson bicycles for the Middle Atlantic States. The automobile supply catalogue is known as No. 37 and the bicycle catalogue as No. 38, and they may be had without charge on application.

The Cleveland Motor Car Company's catalogue combines a description of what the car is and what it does. The former is related in text and excellent half-tone illustrations and the latter is an account from the pen of Walte Hale of a run from Gibraltar to the coast of Normandy in a Cleveland car. It is a racily written description of a unique tour and is embellished with photo engravings and pen sketches of scenes in romantic Spain and historic quarters of France. The account of the tour will interest every man who possesses anything of the roving spirit, whether he has any love for carbureters and coils or not. The analysis of the Cleveland machine is so skillfully done that even the indifferent should find it attractive.

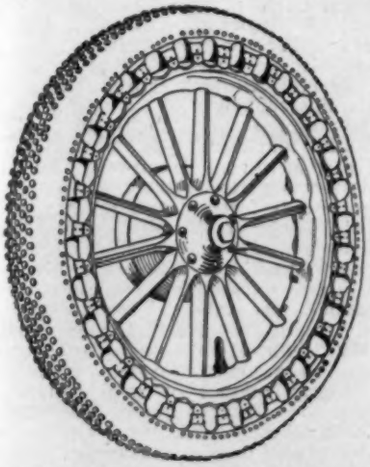
A PHENOMENAL GROWTH.

Though young in years as compared with other industries, the business of supplying, or rather, jobbing, automobile parts and accessories, is one of the most solidly founded in the country to-day, and not the least of its husky infantile representatives is the Neustadt Automobile and Supply Company St. Louis, Mo. From a diminutive, though vigorous beginning, this company has gone forward with such strides as now to occupy a place all its own in the automobile economy of the Middle West, and from the Mississippi to the

Coast. The accompanying illustration gives but a poor idea of the extent of the establishment now occupied exclusively by this concern, which has made a practice of "supplying everything for the automobile" ever since it started, and not content with living up to its motto in a manner equaled by few, has now added a full line of motor boats and accessories in the shape of an independent department devoted to this line. The company anticipates a most successful season, and with the aid of the recently enlarged facilities expects to attract a larger number than ever of tributary buyers to their natural market—St. Louis.

INFORMATION FOR AUTO USERS.

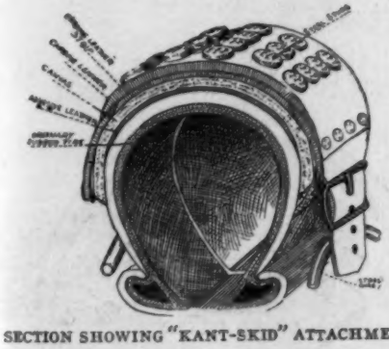
Woodworth Treads and "Kant-Skid" Grips.—The 1907 Woodworth tread has a new method of adjustment, the side wires being made of spring steel crimped or wavy in shape, so that they are self-adjusting and take up the slack automatically. The covers have short straps along the edges, with buckles having hooks on the back to hook



WOODWORTH TREAD ATTACHED TO TIRE.

over the wires. Adjustment for different size tires is made by arranging the buckles on the strap at the proper distance from the edge of the cover.

The nature of the "Kant-Skid" tire grip is self-explanatory. It consists of strips of chrome leather 1 1-4 inches wide, studded with steel rivets placed across the tire about four inches apart. A steel plate riveted under the studs protects the leather and gives additional durability to the device. The cross strips have rings at each end, connected by spring steel links, which can be snapped into place in one second. To make the skid bands fit different size

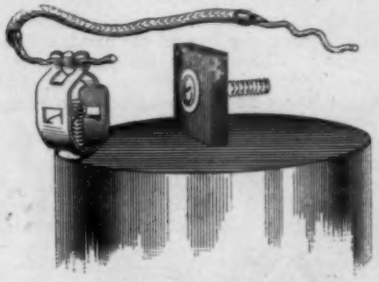


SECTION SHOWING "KANT-SKID" ATTACHMENT.

tires it is only necessary to add or remove one or more sections. The spring side links enable one to do this or to put in new cross pieces to replace worn ones. These straps across the tire present a soft surface to the rubber and cause no injury. They can be used equally well on solid tires without danger of cutting. Both of the above popular appliances are manufactured by the Leather Tire Goods Company, Newton Upper Falls, Mass.

"Oilers" for Wet Weather.—That old-time and well-tried waterproof garment, the Gloucester "slicker," has yielded to modern conditions. Instead of the shapeless oilskins familiar to fisher-folk, we can now have stylish and well-fitted garments made from this material. There is also a new creation in an automobile reversible coat, made with one side of mercerized silk or khaki, and the other side of oil-coated muslin, giving a silky finish. The silk or khaki is left in its natural state, no oil or rubber being used, giving a garment for pleasant weather. The waterproof side, entirely free from the cloth side, is made of fine muslin coated with oil by the Boynton patent process, giving a soft, silky finish. This combination of silk or khaki for one side and a finely finished oilskin for the other gives a sightly garment for all kinds of weather. They are made by the Boynton's Improved Process Oil Clothing Company, Gloucester, Mass.

Handy Dry Battery Connectors.—A clever device that gives a good contact, a quick connection and a wire lock, all these conditions being inter-communicating, is the Standard battery connection. It is made from one piece of brass cut and die-shaped to give this service. At the bottom of the loop is a hole just large enough to permit easy passage over the threaded pole connections. About midway up each arm is an inwardly projecting lip. One arm



NEW DRY BATTERY CONNECTION.

has a slotted end and the other a finger end to form a dovetail joint. By passing the finger through the slot the midway lips act as locks on the threads of the terminal. The connecting wire bridges the dovetail ends, reacting against the locking lips below them, which in turn pull the dovetail apart, only to more securely hold the wire connection. These handy little connectors are made by the Standard Battery Connection Company, 27 Copeland street, Roxbury, Mass.

Emergency Spring Repairer.—Fortunately it is not very often that the automobilist has need of a temporary spring repairer, but when he does want it he wants it mighty bad. The engraving herewith explains clearly the nature of the spring repairer and its method of attachment. The cut is reproduced from a photograph of a broken spring and "Emergency Spring Repairer" which was attached to a five-pas-

EMERGENCY SPRING REPAIRER.

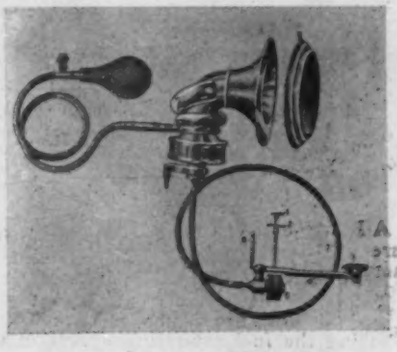
senger 35-horsepower car, which was run over 843 miles on all kinds of roads before the spring was replaced by a new one. The appliance is simple and light and occupies so little space that it can be advantageously included in every equipment. It is made of steel and in sizes to fit every spring. When ordering, the width of spring clips is the only dimension that needs to be given. This appliance is being handled by the Emergency Spring Repairer Company, 5 Beekman street, New York.

An Electric Lamp Lighter.—Using a jump spark gap to light the acetelyne burners is the explanation of this device. The burner outfit has an insulating sleeve, which

NO-MATCH ELECTRIC LAMP LIGHTER.

supports the metal arms carrying the "spark points." The spark gap comes over the gas vent on the lava tip of the lamp. With one of the arms grounded, the other is wired into the secondary circuit of the spark coil. From the primary circuit a lead is carried to a push button at any point convenient to the driver. Pressing the button closes the circuit, a spark occurs across the gas vent and the lamps are "lit while running," the gas also being turned on from the seat. This hand device is manufactured by the No-Match Electric Manufacturing Company, 141 Milk street, Boston, Mass.

A Unique Town and Country Signal.—Leavitt's latest is a combination which is a clever uniting of a siren and a reed horn. Its ownership means the possession of a signal for country and night riding and a horn for city use. As indicated by the name, this is another of the Leavitt novelties, made by the Uncas Specialty Company, Norwich, Conn. The combination is arrived at in a manner both simple and ingenious. Around the throat of the siren portion are carried the coils of the reed part of the horn. At the bend of the throat



LEAVITT'S COMBINATION HORN.

the coil passes through the wall to its bell, which is placed concentric with and inside the siren bell, the two being closed in with the usual screen. Attached to the reed coil is the usual flexible tube and hand bulb. The flexible shaft attachment for the siren portion is particularly good. The shaft itself attaches at both ends by a simple jaw clutch and taper sleeve nut. The position of the friction pulley is adjust-

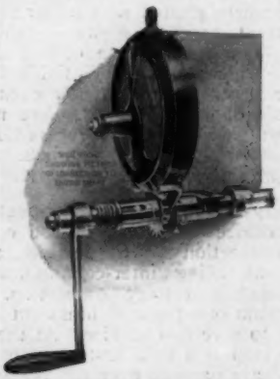
able, and its bearing block resting in a broached hole it becomes positive at any position. The arm carrying this block pivots at its other end in a bracket, which screws to the under side of the floor boards. At the end in which is secured the bearing block the return spring is placed. There is also a free foot plunger for holding the pulley into contact with the fly-wheel.

The "Krackerjack" Jack.—Although closely resembling last year's model, the "Krackerjack" jack has undergone important changes. Pressed steel is now employed for the entire frame, giving minimum weight and maximum strength. The rack bar is of high-grade carbon steel, with the teeth milled out, thereby disposing of any liability to crack or break. The rack bar may be had with or without secondary lift. The internal mechanism is composed of drop forgings carefully ground and fitted, removable at will as if in one piece. A steel pin, provided with a shoulder on one end and a split pin on the other, supports the mechanism in the frame. Raising and lowering is performed in the usual manner, but as the lever handle is inserted close to the base increased ease of operation is secured. To reverse the action it is only necessary to make a one-eighth turn of the handle, thus allowing the load to come down slowly. The manufacturers and selling agents of the jack are the Utility Company, 332 Broadway, New York.

SIDE VIEW OF KRACKERJACK.

A Flexible Carbureter.—The main feature of the Palmbla carbureter, manufactured by the North Chicago Machine Co., is the departure from the accepted methods of producing carburetion by having the fuel aspirating nozzle in the air passage. The multiple jet fuel nozzle is placed above the air passage and mixing chamber and the intake valve is controlled by a calibrated compensating spring. Under such conditions the suction stroke of the motor causes a varied vacuum in the body of the carbureter, and is proportionate to the piston speed. This automatically governs both the supply of the air and the fuel, the mixture being constant under all speeds. The use of an auxiliary air valve is eliminated, as in this system the carburetion process is controlled wholly by vacuum in the mixing chamber rather than by the speed of the air in passing the fuel nozzle. The makers claim that this carbureter is sufficiently flexible to meet the requirements of their convertible two or four-cycle motor.

A Novel Power-Driven Tire Inflator.—It has come to be a trite saying that more tires are ruined by lack of proper inflation than are ever worn out in use, for the pneumatic tire should be inflated to the pressure it is designed to carry at all times. But with the increasing sizes now customary on modern cars the work of hand inflation has come to be so laborious that it is more often slighted than otherwise, with resulting punctures and rim-cutting. To remedy this a Chicago firm is placing on the market a compact and powerful inflator under the name of the "Rotary Triplex Tire Inflator." It consists of a small cylindrical casing mounted on the crankshaft bracket at the forward end of the radiator, and contains three short cylinders and a close-fitting annular gear running on three-point roller bearings, eccentric to the inner walls of the housing, to which the piston rods of the cylinders in question are attached by hinged joints. The rotation of the gear ring carries the cylinders about their axes with it, the air pressure thus generated is delivered through the cylinder heads to the hollow shaft on which they are mounted and from which a connecting tube is led to the tire to be inflated. The pump is permanently attached to the car and is put into action simply by shifting the position of a cotter pin before cranking the engine to start. The same makers, Skinner & Skinner, 1337 Michigan avenue, Chicago, also list a handy pressure indicator for use in connection with the inflator. The illustrations show the small size and simplicity of this convenient pump.



SIDE VIEW, SHOWING CRANK.

END VIEW WORKING PARTS UNCOVERED.

Postal is the apt and expressive title of a new entrant into the field of what has come to be known as the "buggy-about." It is manufactured by the Postal Auto & Engine Company, of Bedford, Ind., and, as its name indicates, it is designed to be capable of that rough-and-ready service which calls for the almost infallible reliability of the postal service. The motor is of the double-opposed horizontal, four-cycle type, air-cooled, and is rated at 12 1-2 horsepower. The transmission is of the planetary type, giving two speeds forward and reverse with a final drive by steel cables. Suspension is by means of two semi-elliptic, inverted springs, 70 inches long, with their ends resting directly on the 1 1-4 inch square section steel axles. The muffler, carbureter and coil are of the best known makes, lubrication being effected by a standard automatic system. The running gear consists of 42-inch front and 44-inch rear Sarven patent wheels, shod with 1 1-8 inch solid rubber tires, brakes being placed on the transmission and the counter-shaft, the latter carrying the emergency. The total weight is 900 pounds and the speed up to 30 miles an hour.

Miller Speed Meter.—A twelve months' guarantee, provided the seal is not broken, is given with every Miller speed meter manufactured by Charles E. Miller, 97-101 Reade street, New York. This speed indicator will register as low as five miles an hour and up to sixty miles an hour, or 100 miles an hour if specially ordered. In addition to showing the rate of speed traveled at any given moment, an odometer attached registers the trip and gives a permanent record up to 10,000 miles. The interior mechanism works on centrifugal principle. The governor spindle is made of tool steel, hardened and ground to size, with fly balls and links of brass. The speed meter is made to be attached to the dashboard and is actuated by means of a flexible shaft and crown gear wheels attached to the front wheel of car. The large gear to be attached to the hub is so made that it can be fitted to any of the domestic or imported cars without extra attachments or fittings.